From:	James Stewart
To:	Sorell Council
Cc:	Brett Woolcott; Colin Smith; Carlton Dixon (cdixon@bmil.com.au)
Subject:	Sorell Draft Local Provisions Schedule Representation - Woolcott Surveys
Date:	Tuesday, 3 August 2021 4:14:36 PM
Attachments:	image001.jpg Annexure 2 - DRAFT SAP VERSION 3 - Local Industry SAP.pdf Annexure 2 - DRAFT SAP VERSION 3 - Local Business Criteria FINAL.docx Anneuxre 1 - Rezone-SAP plan.pdf Annexure 3 - Flooding and stormwater report.pdf Annexure 4 - Concept TIA.pdf Lot 1, Old Forcett Road - Written Submission to Sorell LPS.pdf

Good Morning

Please find attached a submission in relation to the Sorell draft LPS.

The matter relates to the land at Lot 1, Old Forcett Road, Dodges Ferry and has been discussed with Council over the last 12 months. I have attached a draft copy of the SAP should Council wish to make modifications.

I am happy to discuss any part of this representation.

Regards

James Stewart

Senior Town Planner | Accredited Bushfire Practitioner

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WOOLCOTT SURVEYS

EAST COAST SURVEYING

Date 26/07/2021

The General Manager
Sorell Council

Via Email: sorell.council@sorell.tas.gov.au

RE: REPRESENTATION – LOT 1, OLD FORCETT ROAD, DODGES FERRY (CT119465/1)

This letter is written in accordance with section 35E of the *Land Use Planning and Approvals Act* (the Act), which allows any person to make a representation to a planning authority which exhibits a draft Local Provision Schedule (LPS). Sorell Council publicly exhibited the Sorell draft LPS from the 15th June 2021, to the 16th August 2021.

Sorell Council LPS

The subject of this representation is land at Lot 1, Old Forcett Road, Dodges Ferry, CT119456/1 (the site). The land is shown on zoning map '7 of 17', which indicates the lot as going into to the 'Rural zone' under the Tasmanian Planning Scheme (TPS).

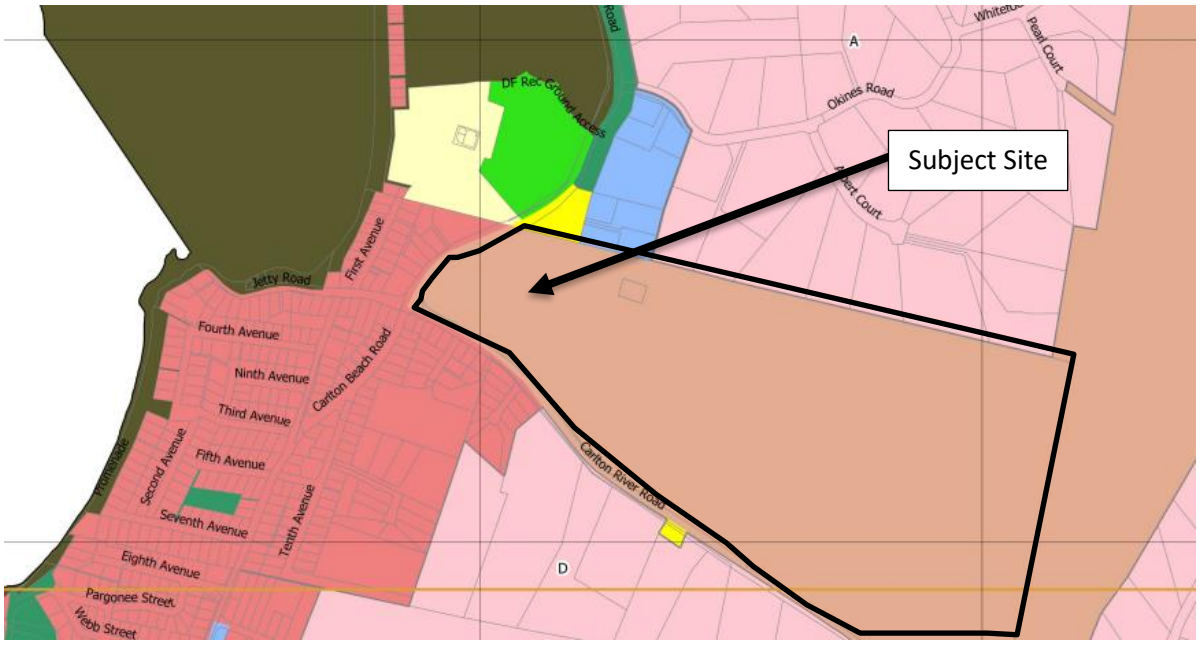

Figure 1 - Subject site location on corner of Old Forcett Road, and Carlton River Road, Dodges Ferry. Proposed to be zoned 'Rural' under the Sorell LPS.

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PO Box 593, Mowbray TAS 7248
P 03 6332 3760

ST HELENS
48 Cecilia St, St Helens
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Rear Studio, 132 Davey St,
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DEVONPORT
2 Piping Lane,
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ABN 63 159 760 479

Representation:

This representation consists of three components, all relative to the site. These are:

a) Rezone a 7ha area of land in the west of the site to 'Local Business' zone under the draft LPS (annexure 1)

b) Insert a Specific Area Plan (SAP), titled over the 7ha area of land which we are proposing for Local Business zoning. The draft SAP criteria (annexure 2) has been prepared as part of this submission and is titled "**SOR-S5.0 Dodges Ferry Local Industry Specific Area Plan**".

c) Extend Councils proposed draft SAP titled 'SOR-S2.0 Southern Beaches On-site Waste Water and Stormwater Management Specific Area Plan" so that it incorporates the 7ha area of land proposed for Local Business zone.

A proposed zoning and SAP map has been prepared which displays the above changes. This is attached as annexure 1 of this submission.

Rationale for The Rezone and SAP

The intention of the Local Business rezone and Local Industry SAP, is to provide a commercial and light industrial area which suits the local needs of the Southern Beaches, encouraging people to work and live within the Sorell municipality.

A shortage of local business and light industrial land within the municipality has been identified. The proposed SAP seeks to provide options for appropriate uses to establish themselves subject to Council approval.

The site is deemed appropriate as it provides for a logical expansion of the existing Local Business zone to the north. The land is situated within a central part of the Dodges Ferry area, being close to existing community services and established residential areas.

The SAP, in recognising the lack of services within Dodges Ferry, customises the local business zone criteria to allow for a range of uses which are considerate of the area, but aims to encourage service industries and light industrial activities. The criteria has been written to ensure the SAP does not compromise or diminish the Sorell township, or negatively impact the Carlton Beach business/retail precinct to the south.

The SAP does not create a new neighbourhood centre for retail shops and local conveniences, but rather seeks to add a light industrial and commercial aspect to the site, by providing an area where smaller operators within the Southern Beaches and Sorell area can become established.

Providing an area within the municipality which can directly service the local community is viewed as critical.

In discussions with Council, it is understood that there are a significant number of home-based businesses becoming established, either in undesirable locations (i.e., residential areas) or without appropriate permits. In the absence of a suitable area for such uses, the risk of land use conflict between commercial/industrial development and residential use increases.

Some recent examples of potentially inappropriate uses becoming established within the municipality are shown below:

Use	Location
Fiberglass repairs and maintenance	Residential/Rural area (Pawleena Road – Sorell)
Contractors Depot	Residential area (Provence Drive – Dodges Ferry
Fire pit construction	Residential Area (Quarry Road – Forcett)
Quad Bikes and Go Kart Hire	Residential Area (Nerine Street – Primrose Sands)
Contractors Depot	Rural Area (Drovers Rise – Carlton River
Mechanical Repairs	Residential Area (Neagarra Street – Dodges Ferry)
Spray Painting Business	Residential Area (Pendall Drive, Forcett)
Kitchen Manufacturing	Residential Area (Wolstenholme Drive, Sorell)
Kitchen Manufacturing	Rural/Residential Area (Arthur Highway, Sorell)
Vet Clinic	Residential Area (Parnella Road, Dodges Ferry)

In addition to the above, Council have also reported a large number of enquiries for new businesses. In the absence of appropriately zoned land, where such uses and businesses can establish themselves presents a significant challenge. Enquiries include:

- Crayfish depot, (storage prior to export);
- Funeral home for the Southern Beaches area;
- Fitness centre/yoga studio for the Southern Beaches area;
- Child care centre for the Southern Beaches area;
- Storage warehouses for the Southern Beaches

This is further demonstrated by the Tasmanian Planning Commission, who in 2019, approved a Scheme Amendment to allow Bulky Goods Sales and Service Industry to become established within the Local Business zone at 1D Okines Road, Dodges Ferry. The amendment was proposed within the Local Business zone, on the basis that there was no appropriately zoned land for the proposed use.

Council's traffic analysis indicates that there is currently a large number of blue-collar workers that transit to Hobart via Midway Point on a regular basis. It is understood that the number of blue-collar workers leaving the municipality for work purposes is continually growing as the municipality develops.

The implementation of the Tasmanian Irrigation Scheme (TIS) within the municipality has increased demand for storage, and service industry related activities, along with a suitable supply of appropriately zoned land. Many of the primary industry uses across the municipality are flourishing due to the implementation of the TIS. This includes berry farms, orchards, oyster/abalone farming etc. Having an appropriately zoned area for such businesses to obtain their supplies or materials within the municipality would ensure operators don't need to travel outside of the municipality for supplies, materials, and provisions.

The implementation of a SAP would assist local operators by providing an area that can be developed, whilst recognising the lack of suitably zoned land for these services in the Southern Beaches area.

Location and Adjoining Land

The site is currently within the Rural Resource Zone under the *Sorell Interim Planning Scheme 2015*. The site is proposed to go into the Rural Zone under the Sorell draft LPS.

The area proposed for rezoning and implementation of the SAP, is a smaller section of the land, being 7ha at the western part of the lot (annexure 1). The balance of the lot extends to the east (Figure 1).

The site is located at the junction of Carlton River Road and Old Forcett Road. Council has recently upgraded the junction, installing culverts and constructing bus parking bays at this intersection. The site adjoins residential development to the west and south, commercial use to the north and rural land to the east. The site is opposite the local school and in close proximity to 'Shark Park' recreational facilities to the north west. It is central to Dodges Ferry and the broader Southern Beaches sub-regions, including Carlton, Carlton River, Lewisham and Primrose Sands.

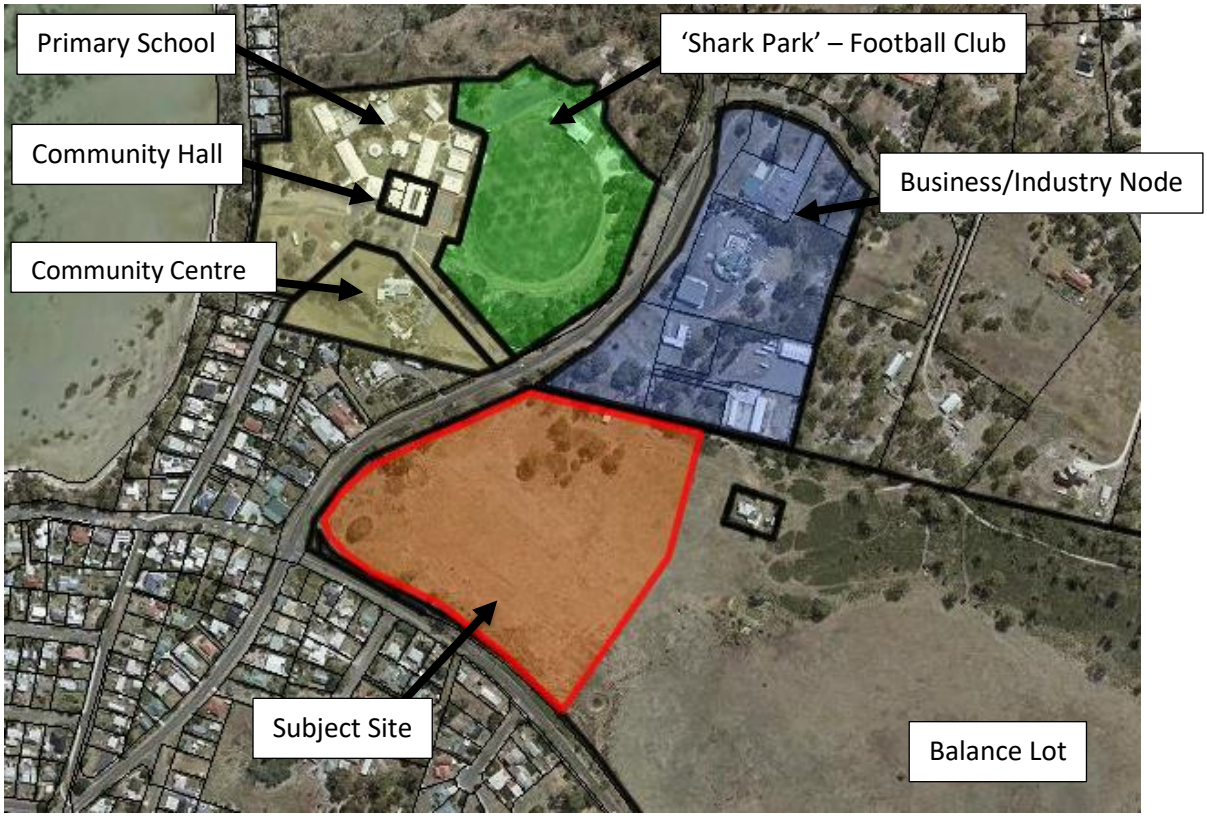

Figure 2 – Overview of the commercial and community uses in the surrounding area.

This location, along with the commercial area of Carlton Beach Road / Signal Hill Road, are the two focal points for commercial and community activity in Dodges Ferry. Currently, the residential, commercial and public use areas (school and sporting facilities) are in close proximity to rural land with no distinct buffer or separation between them.

The site is south of an existing Local Business zone which provides for the current uses of a hotel, bottle shop, service station, gym and warehouse. There is also a section of Utilities zoned land north of the site, located between the Local Business Zone and Old Forcett Road,

which is currently vacant other than for driveway access to three lots within the Local Business Zone.

The Low-Density Residential Zone applies to the west and south, being developed with a number of dwellings fronting Old Forcett Road, Carlton River Road, Jetty Road, Chaffey's Drive and Nicholas Avenue.

There is a total of 2ha of Light Industrial zoned land within this area, all of which is associated with an existing business at Josephs Road adjoining the waste transfer station. In addition to the industrial land, there is a total of 6.09ha of Local Business zoned land, the majority of which has been developed.

The Australian Bureau of Statistics records census information for a consolidated region that includes Dodges Ferry, Lewisham and Carlton suburbs (Dodges Ferry – Lewisham UCL). This region has a population of 4621 persons and 1243 families

Subject Site Characteristics

The entire site, as shown in Figure 1, is 61.72 hectares in size. The representation to rezone and overlay the site with a SAP is focused to a smaller area of 7ha, as shown in annexure 1. The site is vacant, other than a small outbuilding in the north-west corner. The site is generally grassland with a section of vegetation in the north east. This vegetation will not be impacted by the proposal.

At the western boundary of the site there is a small lot containing an existing dwelling (531 Old Forcett Road). This lot has a benefitting right of way over the site through to Old Forcett Road. The site is flat with limited gradient. There are no title restrictions or encumbrances by way of easements, Part 5 agreements or other means.

Figure 3 - Looking east over subject site

Figure 4 - Recently upgraded section of Old Forcett Road. Looking south, subject site on left of photo.

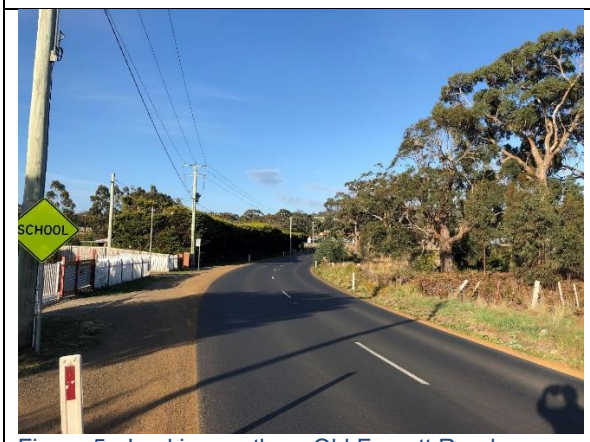

Figure 5 - Looking north on Old Forcett Road, subject site on right of photo

Figure 6 - Looking south east over subject site

Topography and Watercourses

The site is relatively flat and lies between the 5m and 14m elevation. There is an east-west aligned drainage depression running centrally through the site which acts as an overland flow path. All of the site has a slight fall to this depression but the overall aspect is westerly. The highest part of the site is at the existing house at 531 Old Forcett Road, which sits on a slight high point in the immediate landscape.

Runoff from the surrounding hills flows through the site, however, there is no readily identifiable watercourse or drainage line. Historically, there has been localised flooding associated with the drainage line, likely due to the land being lower than the level of the surrounding road network. Recent improvements at the junction of Carlton River Road and Old Forcett Road have increased the drainage capacity under the road network and will help alleviate this issue.

A flood assessment has been undertaken by Flussig and is submitted as part of this submission. The report concluded that appropriate development of the land was achievable, subject to the following recommendations:

1. Any future subdivisions should provide allowance for an overland flow path through the subdivision utilising the natural lows in topography as much as possible.

2. Utilising the entrance and exit location at the OFP exit site will provide a reduced impact on flow and on allowable building areas.

3. A total OSD volume of 750.0m3 is required to detain the maximum developed 2% AEP from pre - to post - development. This will likely require the designation of a single lot for this detention facility.

4. Detention ponds above and below the proposed subdivision sites will be required to be modified to control flow through the subdivision.

5. 2% AEP for future subdivision to be piped to the 2% AEP and drain to the detention pond.

6. Spillway for the detention pond should be designed considering maximum flood forces.

7. The base of the detention pond should be designed as a wetland to best utilise the space during high frequency rainfall events.

8. Proposed treatment to meet stormwater strategy can consist of a GPT and wetland arrangement.

9. All devices and overland flow paths are to be designed to ensure they are fit for purpose and maintained to ensure they do not fail.

Under the Stormwater Management plan, the development site will meet current specified standards for both quantity and quality control.

A full copy of the flood report completed by Flussig is attached as annexure 3 to this submission.

Risk of land use conflict
The rezone and SAP results in minimal potential for land use conflict. The subject site adjoins an existing business/commercial pocket of Dodges Ferry, with the adjoining land to the north currently zoned Local Business. The land to the east is zoned Rural Resource, which provides for rural and agricultural permitted and discretionary uses.

There is an existing dwelling situated to the east, on 531 Old Forcett. The SAP and zone boundary has been deliberately setback from this property, ensuring a buffer is in place between future commercial/industrial uses and the existing residential use.

Land to the south and west is separated by Carlton River Road and Old Forcett Road, which provides a buffer and reasonable setback from residential uses.

The underlying Local Business zone also provides protections for surrounding residential uses under use standards clause 14.3 of the TPS zone standards. These provisions include hours of operation, external lighting, and vehicle movements on the site.

The current zoning of Rural Resource, which primarily seeks to support primary industry allows for a number of inappropriate uses to be applied for. By rezoning the site, the risk of land use conflict is reduced.

Based on the nature of the site, character of the area, and above-mentioned protections, the risk of land use conflict is reduced to minimal.

Sorell Land Supply Analysis
In 2019, Sorell Council updated its Land Supply Strategy. The Strategy considers the entire municipality and has a 20-year life (to 2038). The results of Stage 1 are documented.

The Land Supply Strategy addresses the following:

- Stage 1: Land supply and demand analysis for residential, industrial and commercial land.
- Stage 2: Assessment of expansion options for residential, industrial and commercial land.
- Stage 3: Preparation of masterplans for expansion options for residential, industrial and commercial land.

In addressing the availability of Local Business land, the report shows that there is currently 1.45ha of vacant local business land within the municipality, and, that there is a need for additional Local Business zoned land within the Southern Beaches locality as the provision of services and facilities to local residents is minimal (Section 5.3).

In addressing Industrial land, the report states that there is a limited supply in Sorell. Between 2009-2018, 30 industrial buildings were approved, averaging 3 buildings a year, however, the report also says that historic trends of approvals are not a reliable indicator for predicting future demand.

The Stage 1 report estimates that the demand for local services will increase. Lots of between 2000m^2 to 5ha will be required to accommodate projected commercial and industrial use

demand. Importantly, the report mentions that potential lots will need to be around 5ha in size to create critical mass and justified investment in an industrial estate.

The Stage 2 report provides an assessment of expansion options for residential, industrial and commercial land in the municipality. Industrial options that are explored are focused exclusively on the Sorell township as the was the directive given to the consultant by Council at the time of the project, given the well-recognised shortage of industrial land.

The Stage 2 report discusses rezoning land to the west of the existing business zone (Figure 7) in Dodges Ferry. We submit that this land is too constrained for the type of development needed to satisfy the known demand for industrial and commercial services. In addition, given the anticipated type of development that would be required (large warehouses etc.) the identified land leaves minimal space for setbacks or landscaping and does not allow for expansion, being constrained to the west, north and east. It is assumed that this land was selected on the basis that it was Council owned and adjoined the existing Local Business Zone.

The subject site at Lot 1 Old Forcett Road, is a more appropriate solution and the proposed SAP provides for use and development which targets local industry. The site adjoins the existing Local Business Zone as well as the expansion area suggested by the Stage 2 report. The site has enough area and appropriate dimensions to develop at critical mass, allow for setbacks and landscaping and provide space for adequate access, paved areas and manoeuvrability. The type of development needed by the community at large can be provided for on the subject site. There is also ample room for expansion to the east subject to future scheme amendments and uptake of land.

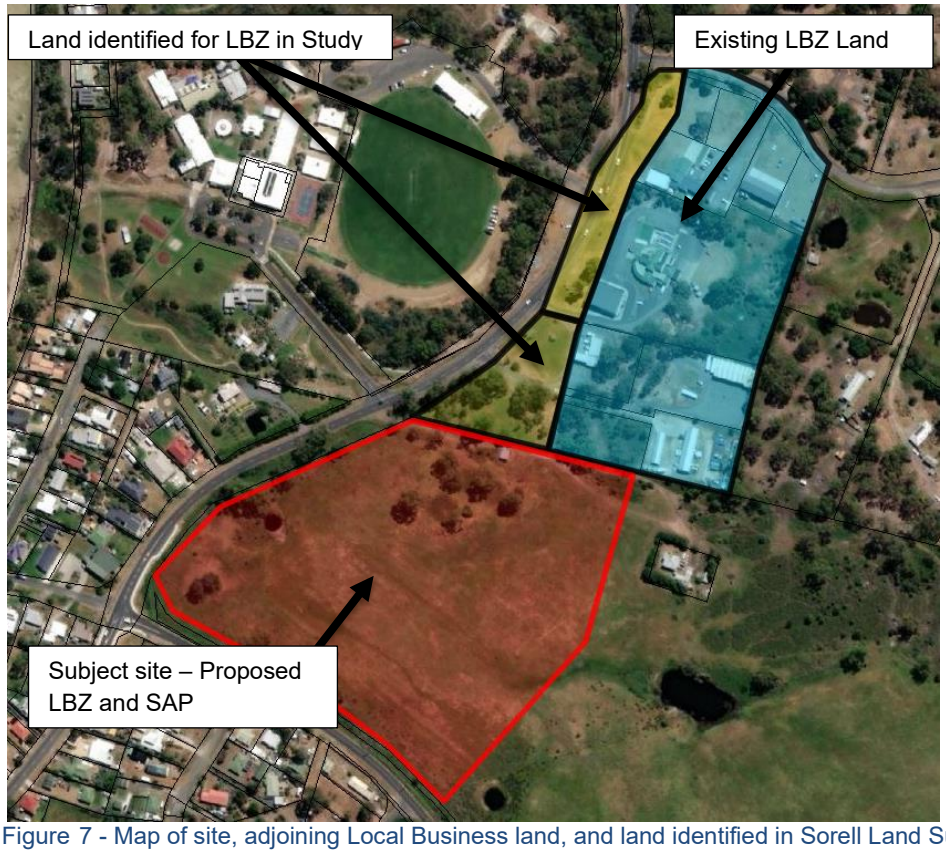

Figure 7 - Map of site, adjoining Local Business land, and land identified in Sorell Land Supply Study.

Impact on the region

The rezoning and SAP objective is to facilitate land use for local service industries with appropriate development controls to achieve stormwater standards and protect residential amenity. The desired effect in economic, social and environmental terms will be a positive one.

The Sorell township (north west of Dodges Ferry) is included in the planning of industrial supply land across the region. Sorell has next to zero potential supply of industrial land. The demand for industrial land at Sorell is currently being met outside the municipal area at Cambridge Park or Mornington. This rezone and proposed SAP has the potential to help fulfill demand for industrial land at Sorell, being in reasonable proximity to Sorell and within the municipality.

Southern Tasmanian Regional Land Use Strategy

The Southern Tasmanian Regional Land Use Strategy 2010 – 2035 (STCA) provides a number of relevant policies and actions across themes of infrastructure, industrial activity, and activity centres.

Physical infrastructure

Relevant infrastructure policies include:

PI 1 *Maximise the efficiency of existing physical infrastructure*

PI 2 *Plan, coordinate and deliver physical infrastructure and servicing in a timely manner to support the regional settlement pattern and specific growth management strategies*

Dodges Ferry is an unserviced settlement. TasWater have no plans to provide a reticulated service and future development needs to accommodate onsite services, which is reflected in the proposed SAP, and provided for within the underlying zoning.

Council has upgraded stormwater drainage in the area alleviating a former capacity constraint. A stormwater management and flood report has been prepared for the site (annexure 3), which demonstrates that given an appropriately designed road layout, along with onsite detention, bunding, and stormwater quality treatment, that the site is appropriate for development.

With respect to the site, the proposed rezoning and SAP further the industrial activity policies of the RLUS.

Industrial Activity

The industrial activity policies are:

PI 2 *Plan, coordinate and deliver physical infrastructure and servicing in a timely manner to support the regional settlement pattern and specific growth management strategies*

IA1 *Identify, protect and manage the supply of well-sited industrial land that will meet regional need across the 5, 15- and 30-year horizons.*

IA 1.1 Ensure industrial land is relatively flat and enables easy access to major transport routes, other physical infrastructure such as water, wastewater, electricity and telecommunications.

IA 1.2 Locate new industrial areas away from sensitive land uses such as residentially zoned land.

IA 1.3 Provide for a 30-year supply of industrial land, protecting such land from use and development that would preclude its future conversion to industrial land use - in accordance with the recommendations within the Southern Tasmania Industrial Land Strategy 2013.

IA 1.4 Provide a 15-year supply of industrial land, zoned for industrial purposes within the new planning schemes - in accordance with the recommendations within the Southern Tasmania Industrial Land Strategy 2013.

IA 1.5 Aim to ensure a minimum 5-year supply of subdivided and fully serviced industrial land.

IA 1.6 Take into account the impact on regional industrial land supply, using best available data, prior to rezoning existing industrial land to non-industrial purposes.

IA 2 Protect and manage existing strategically located export orientated industries.

IA 2.1 Identify significant industrial sites through zoning and ensure that other industrial uses not related to its existing function do not diminish is strategic importance.

IA 3 Ensure industrial development occurs in a manner that minimises regional environmental impacts and protects environmental values.

IA 3.1 Take into account environmental values and the potential environmental impacts of future industrial use and the ability to manage these in the identification of future industrial land.

The subject site will not, on the whole, cater for regional industrial needs. The location of the site, the distance to Greater Hobart and the lack of reticulated services, all combine, to various degrees, to ensure that the land made available can only meet local service needs.

Items IA 1.1 to IA 1.6 are policies that apply at a regional scale, including areas assessed in the *Southern Tasmanian Industrial Land Strategy 2015.* The Southern Beaches was not included in the assessment undertaken for the regional industrial land strategy. Item IA 2.1 does not apply as the land will not support export industries. It is submitted that the rezone and SAP does not need to demonstrate compliance with these policies as they are not applicable to the form or location of industrial activity. These policies do, however, provide useful guidance and principles for siting local service industrial needs, for instance, IA 3.1 is a relevant policy.

The subject site is a flat area of land with good road access and frontage. There are no

environmental values on the site. The management of stormwater has been considered and planned for. The current demand for commercial and industrial land is demonstrated by the earlier analysis of the non-conforming use that can be found in Southern Beaches. This proposal takes a long term view of demand an sets aside a large area of industrial land for short, medium and long term projections.

The site has good separation from residential areas, and this is further reinforced by the provisions of the zone. The SAP will provide for landscaping, further providing for visual amenity and visual separation of the development from the residential areas and community areas.

Activity Centres

This part of the RLUS may be relevant depending on whether the adjoining Local Business Zone, school and sports ground are an Activity Centre, as defined in the RLUS, and if so, whether the proposed rezone and SAP has any adverse effect.

The RLUS defines an Activity Centre as:

> *… mixed use areas that provide a focus for services, employment, retail and commercial activity and social interaction in cities and towns. They also include community meeting places, community and government services, education facilities, settings for recreation, leisure and entertainment and may include in larger activity centre residential development in mixed land use settings.*

The surrounding area does provide a focus for social interaction and services, albeit at a small-scale. For current purposes, the area is considered to be an activity centre and to sit at the Local Centre level of the RLUS hierarchy. Relevant policies include:

AC 1 *Focus employment, retail and commercial uses, community services and opportunities for social interaction in well-planned, vibrant and accessible regional activity centres that are provided with a high level of amenity and with good transport links with residential areas.*

AC 1.1 *Implement the Activity Centre Network through the delivery of retail, commercial, business, administration, social and community and passenger transport facilities.*

AC 1.2 *Utilise the Central Business, General Business, Local Business Zones to deliver the activity centre network through planning schemes, providing for a range of land uses in each zone appropriate to the role and function of that centre in the network.*

AC 1.3 *Discourage out-of-centre development by only providing for in-centre development within planning schemes.*

AC 1.4 *Promote a greater emphasis on the role of activity centres, particularly neighbourhood and local activity centres, in revitalising and strengthening the local community.*

AC 1.5 *Ensure high quality urban design and pedestrian amenity through the respective development standards.*

AC 1.6 Encourage an appropriate mix of uses in activity centres to create multi-functional activity in those centres.

AC 1.7 Improve the integration of public transport with Activity Centre planning, particularly where it relates to higher order activity centres.

AC 1.8 Ensure that new development and redevelopment in established urban areas reinforce the strengths and individual character of the urban area in which the development occurs.

AC 1.9 Require active street frontage layouts instead of parking lot dominant retailing, with the exception of Specialist Activity Centres if the defined character or purpose requires otherwise.

AC 1.10 Activity centres should encourage local employment, although in most cases this will consist of small-scale businesses servicing the local or district areas.

AC 1.11 Provide for 10 – 15 years growth of existing activity centres through appropriate zoning within planning schemes.

The rezoning and SAP are considered to be consistent with the above in that:

- Commercial and Industrial land use would increase the extent of social interaction in the area through employment and exchange of services;
- The amenity of the streetscape will be enhanced by landscaping along the frontage and appropriate development standards applied through the Specific Area Plan and the underlying zone standards;
- Implementing a Local Business Zone and SAP would reduce current pressure upon the Local Business Zone to the north, accommodating low level industrial activity as evident by amendments before the Council.
- The rezone and SAP assists in ensuring long-term growth potential exists in the zone.

The RLUS also provides residential growth management strategies for settlements. Dodges Ferry is listed as having a low growth strategy through consolidation. As such, there is limited demand for additional residential land and no opportunity to provide residential land by converting green fill land from the Rural Resource Zone to a residential zone.

8A Guidelines Response

The guidelines were produced in June 2018 to provide an easy reference guide for the application of zones and codes.

A response is provided below in relation to the application of the Local Business Zone to the subject site.

<u>LBZ 1:</u>

The Local Business zone has been proposed for land within an Urban Settlement. The intent of the area is to provide for business and commercial functions which service the local

community. There are a number of small businesses (mechanic, hotel, gym etc) within this section of Old Forcett Road, which are all in close proximity to a school, community hall and community garden. Extending the zone to the subject site, which adjoins this area, is a logical expansion of the existing business area.

LPZ 4:

The proposed zoning is not being applied to isolated shops, but rather adjoins a group of existing businesses, which are currently located within the Local Business Zone. The Sorell Land Supply Study has recognised that the existing Local Business area needs to expand, and identifies the narrow strip to the west of the existing development to be rezoned to Local Business. Council has not chosen to rezone that land as part of the LPS.

The fact that land was identified in this area, indicates that there is intent and a need to expand the Local Business zone and the subject site directly adjoins the area which is currently zoned Local Business. Whether it is the land to the west of the existing business area, or the subject site to the south which is rezoned, makes little difference from a strategic perspective as the objective will still be met.

It is our opinion that the subject site provides greater opportunities than the narrow strip of open space/utilities land to the north. We contend that the subject site is more appropriate for Local Business zoning then the adjoining land to the north, and provides more scope for appropriate future development.

We are happy to discuss the contents of the proposed rezone and SAP further should Council wish.

Kind regards
Woolcott Surveys

James Stewart
Senior Town Planner

THIS PLAN WAS PREPARED FOR PRELIMINARY DISCUSSION ONLY AND SHOULD NOT BE USED FOR ANY OTHER PURPOSE.

PRIMARY SCHOOL

RECREATION PARK

COMMUNITY PURPOSE

RECREATION

LOCAL BUSINESS

RURAL LIVING

BEACH

OKINES

ROAD

UTILITIES

EXISTING RIGHT OF WAY 6.00 WIDE

FORCETT

PROPOSED NEW ZONE 'LOCAL BUSINESS' ±7.00ha

531 OLD FORCETT ROAD, DODGES FERRY

RURAL RESOURCE

OLD

CARLTON

PROPOSED NEW ZONE BOUNDARY

Represents area to be subject to the 'Dodges Ferry Local Industry Specific Area Plan'. 'SOR-S2.0 Southern Beaches Onsite Wastewater and Stormwater Management Specific Area Plan' to be extended to include this area.

RIVER

BALANCE ±54.72ha

ROAD

LOW DENSITY RESIDENTIAL

RURAL RESOURCE

ENVIRONMENTAL LIVING

RURAL LIVING

RURAL LIVING

LOW DENSITY RESIDENTIAL

Notes:

All dimensions and areas are approximate only and subject to survey.

PROPOSED REZONE & SPECIFIC AREA PLAN

LOT 1 OLD FORCETT ROAD DODGES FERRY

C.T.119465/1

N

WOOLCOTT SURVEYS

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Job Number	Drawn	File name	Date	Scale	Edition	Sheet
H191003	BMW	H191003_PROPOSALPLAN_V06.DWG	25/06/21	1:5000 @ A3	V.06	1/1

SOR-S5.0 Dodges Ferry Local Industry Specific Area Plan

SOR-S5.1 Plan Purpose

The purpose of the Dodges Ferry Local Industry Specific Area Plan is:

SOR-S5.1.1 To provide for offices, manufacturing, processing, repair, storage and distribution of goods and materials to service the needs of the Southern Beaches.

SOR-S5.1.2 To provide for the onsite provision and management of water, sewer and stormwater infrastructure for business and light industrial use.

SOR-S5.1.3 To protect the amenity of adjoining residential and community uses through the management of potential conflicts.

SOR-S5.1.4 To provide for use or development that supports industrial activity, resource processing and local service industry uses that support the aquaculture and agriculture industries of the municipality.

SOR-S5.2 Application of this Plan

SOR-S5.2.1 This specific area plan applies to the area of land designated as the Dodges Ferry Local Industry Specific Area Plan on the overlay maps.

SOR-S5.3 Local area objectives

SOR-5.3.1 The local area objectives applicable to the Dodges Ferry Specific Area Plan include:

(a) The function of the site for business and industrial use is protected, with land released at a rate appropriate to the local service needs of the Southern Beaches area, and sufficient land available for long-term needs.

(b) A high standard of amenity is maintained through landscaping across the plan area, with a particular emphasis on perimeter plantings to partially screen business and industrial activity from adjoining residential uses.

(c) Stormwater will be managed to achieve the Tasmanian State Stormwater Strategy quality and quantity targets through water sensitive urban design practices that include road side table drains, formed open drains and stormwater retention and treatment basins.

SOR-5.5 Use Table

Use Class	Qualification
No Permit Required	
Natural and Cultural Values Management	
Passive Recreation	
Utilities	If for minor utilities
Permitted	
Business and Professional Services	If for: (a) an office; or (b) a veterinary centre.
Emergency Services	
Equipment Machinery Sales and Hire	
Manufacturing and Processing	
Research and Development	
Service Industry	
Storage	
Transport Depot and Distribution	
Discretionary	
Bulky Goods Sales	If for: (a) a supplier for extractive industry, resource development or resource processing; or (b) a garden and landscaping materials, trade or hardware, supplier.
Community Meeting and Entertainment	If for a place of worship.
Educational and Occasional Care	If for an employment training centre.
Food Services	If not for a take away premises with a drive through facility

Recycling and Waste Disposal	If for a recycling depot.
Resource Processing	
Sports and Recreation	
Utilities	If not listed as No Permit Required.
Vehicle Fuel Sales and Service	
Vehicle Parking	

SOR-S5.6 Use Standard

This sub-clause in not used in this specific plan area.

SOR-S5.7 Development Standards for Buildings and Works

SOR-S5.7.1 Setback to a frontage

This clause is in substitution for Local Business Zone - clause 14.4.2 Setback A1 and P1.

Objective	To provide for appropriate building setbacks to roads.

Acceptable Solutions	**Performance Criteria**
A1.1 Buildings must have a setback from a frontage of not less than: (a) 5m to Carlton River Road frontage; (b) 3m to all other frontages	**P1.1** Buildings must have a setback from a frontage that provides adequate space for vehicle access, parking and landscaping, having regard to: (a) The topography of the site; (b) The setback of buildings on adjacent properties; and (c) The safety of road users
A1.2 Buildings must have a setback from a frontage of not less than: (a) 7.5m to Old Forcett Road frontage;	**P1.2** No performance Criteria

SOR-S5.7.2 Landscaping and Site Coverage

This clause is in addition to the Local Business Zone – clause 14.4 Development Standards for Buildings and Works.

Objective	To provide opportunity for landscaping and site drainage
Acceptable Solutions	**Performance Criteria**
A1 An area not less than 10% of the total area of the lot is to be landscaped.	**P1** Landscaping must be implemented that provides for partial screening from nearby residential properties, as well as implementing water sensitive urban design measures.

SOR-S5.8 Development Standards for Subdivision

SOR-S5.8.1 Lot design

This clause is in substitution to the Local Business Zone – clause 14.5.1 Lot design

Objective:	That each lot: (a) has an area and dimensions appropriate for use and development in the specific area plan; and (b) is provided with appropriate access to a road.
Acceptable Solutions	**Performance Criteria**
A1 Each lot, or a lot proposed in a plan of subdivision, must: (a) have an area of not less than 2000m^2 and: (i) be able to contain a minimum area of 30m x 30m clear of: a. all setbacks required by Clause SOR-S5.7.1 A1 and A2; b. all setbacks required by Clause 14.4.2 A2	**P1** Each lot, or a lot proposed in a plan of subdivision, must have sufficient useable area and dimensions suitable for its intended use, having regard to: (a) the relevant requirements for development of buildings on the lot; (b) existing buildings and the location of intended buildings on the lot; (c) the topography of the site; (d) the presence of any natural hazards; and

c. easements or other title restrictions that limit or restrict development; and (ii) existing buildings are consistent with the setback required by Clause SOR-S5.7.1 A1, A2 and 14.4.2 A2; (b) be required for public use by the Crown, a council or a State authority; (c) be required for the provision of Utilities; or (d) be for the consolidation of a lot with another lot provided each lot is within the same zone.	(e) the pattern of development existing on established properties in the area.

A2 Each lot, or a lot proposed in a plan of subdivision, must have a frontage of not less than 25m.	**P2** Each lot, or a lot proposed in a plan of subdivision, must be provided with a frontage or legal connection to a road by a right of carriageway, that is sufficient for the intended use, having regard to: (a) the efficient utilization of land; (b) the topography of the site; (c) the size and shape of the site; (d) the functionality and useability of the frontage; (e) the anticipated nature of vehicles likely to access the site; (f) the ability to manoeuvre vehicles on the site; and (g) the ability for emergency services to access the site.
A3 Each lot, or a lot proposed in a plan of subdivision, must be provided with a vehicular access from the boundary of the lot to a road in accordance with the requirements of the road authority.	**P3** Each lot, or a lot proposed in a plan of subdivision, must be provided with reasonable vehicular access to a boundary of a lot or building area on the lot, if any, having regard to: (a) the topography of the site; (b) the distance between the lot or building area and the carriageway; (c) the nature of the road and the traffic, including pedestrians; and (d) the pattern of development existing on established properties in the area.

SOR-S5.8.2 Subdivision Landscaping

This clause is in addition to the Local Business Zone – clause 14.5 – Development Standards for Subdivision.

Objective:	To ensure a high standard of appearance across the plan area.
Acceptable Solution	**Performance Criteria**
A1 Subdivision must incorporate landscaping in the form of: (a) landscaped public open space 7.5m wide along the frontage of Old Forcett Road; (b) one tree per lot frontage capable of growing to a height of not less than 10m.	**P1** No Performance Criteria.

SOR-S5.8.3 Road Design

This clause is in addition to the Local Business Zone – clause 14.5 – Development Standards for Subdivision

Objective:	To provide for the safe and efficient movement of vehicles.
Acceptable Solution	**Performance Criteria**
A1 Subdivision does not create any new road.	**P1** The arrangement of roads must provide for reasonable movement of vehicles throughout the plan area, having regard to: (a) acceptable levels of access, safety, convenience; (b) any future subdivision of land within the plan area;

	(c) the minimization of internal lots.

SOR-S5.8.4 Stormwater Management

This clause is in substitution to the Local Business Zone – clause 14.5.2 Services A3 and P3

Objective:	To provide for treatment of stormwater quality and quantity.
Acceptable Solution	**Performance Criteria**
A1 On-site detention devices must be incorporated in the development so that the flow rate of stormwater outside the boundaries of the title is no greater than if the land was used for rural purposes.	**P1** Stormwater may only be discharged from the site in a manner that will not cause an environmental nuisance, and that prevents erosion, siltation or pollution of any waterways, coastal lagoons, coastal estuaries, wetlands or inshore marine areas, having regard to: (a) the intensity of runoff that already occurs on the site before any development has occurred for a storm event of 1% Annual Exceedance Probability (pre-development levels); (b) how the additional runoff and intensity of runoff that will be created by the subdivision for a storm event of 1% Annual Exceedance Probability, will be released at levels that are similar to those identified at the pre-development levels of the subdivision;

	(c) whether any on-site storage devices, retention basins or other Water Sensitive Urban Design (WSUD) techniques are required within the subdivision and the appropriateness of their location; (d) overland flow paths for overflows during extreme events both internally and externally for the subdivision, so as to not cause a nuisance.

SOR-S5.0 Dodges Ferry Local Industry Specific Area Plan

SOR-S5.1 Plan Purpose

The purpose of the Dodges Ferry Local Industry Specific Area Plan is:

SOR-S5.1.1 To provide for offices, manufacturing, processing, repair, storage and distribution of goods and materials to service the needs of the Southern Beaches.

SOR-S5.1.2 To provide for the onsite provision and management of water, sewer and stormwater infrastructure for business and light industrial use.

SOR-S5.1.3 To protect the amenity of adjoining residential and community uses through the management of potential conflicts.

SOR-S5.1.4 To provide for use or development that supports industrial activity, resource processing and local service industry uses that support the aquaculture and agriculture industries of the municipality.

SOR-S5.2 Application of this Plan

SOR-S5.2.1 This specific area plan applies to the area of land designated as the Dodges Ferry Local Industry Specific Area Plan on the overlay maps.

SOR-S5.3 Local area objectives

SOR-5.3.1 The local area objectives applicable to the Dodges Ferry Specific Area Plan include:

(a) The function of the site for business and industrial use is protected, with land released at a rate appropriate to the local service needs of the Southern Beaches area, and sufficient land available for long-term needs.
(b) A high standard of amenity is maintained through landscaping across the plan area, with a particular emphasis on perimeter plantings to partially screen business and industrial activity from adjoining residential uses.
(c) Stormwater will be managed to achieve the Tasmanian State Stormwater Strategy quality and quantity targets through water sensitive urban design practices that include road side table drains, formed open drains and stormwater retention and treatment basins.

SOR-5.5 Use Table

Use Class	Qualification
No Permit Required	
Natural and Cultural Values Management	
Passive Recreation	
Utilities	If for minor utilities
Permitted	
Business and Professional Services	If for: (a) an office; or (b) a veterinary centre.
Emergency Services	
Equipment Machinery Sales and Hire	
Manufacturing and Processing	
Research and Development	
Service Industry	
Storage	
Transport Depot and Distribution	
Discretionary	
Bulky Goods Sales	If for: (a) a supplier for extractive industry, resource development or resource processing; or (b) a garden and landscaping materials, trade or hardware, supplier.
Community Meeting and Entertainment	If for a place of worship.
Educational and Occasional Care	If for an employment training centre.
Food Services	If not for a take away premises with a drive through facility

Recycling and Waste Disposal	If for a recycling depot.
Resource Processing	
Sports and Recreation	
Utilities	If not listed as No Permit Required.
Vehicle Fuel Sales and Service	
Vehicle Parking	

SOR-S5.6 Use Standard

This sub-clause in not used in this specific plan area.

SOR-S5.7 Development Standards for Buildings and Works

SOR-S5.7.1 Setback to a frontage

This clause is in substitution for Local Business Zone - clause 14.4.2 Setback A1 and P1.

Objective	To provide for appropriate building setbacks to roads.

Acceptable Solutions	**Performance Criteria**
A1.1 Buildings must have a setback from a frontage of not less than: (a) 5m to Carlton River Road frontage; (b) 3m to all other frontages	**P1.1** Buildings must have a setback from a frontage that provides adequate space for vehicle access, parking and landscaping, having regard to: (a) The topography of the site; (b) The setback of buildings on adjacent properties; and (c) The safety of road users
A1.2 Buildings must have a setback from a frontage of not less than: (a) 7.5m to Old Forcett Road frontage;	**P1.2** No performance Criteria

SOR-S5.7.2 Landscaping and Site Coverage

This clause is in addition to the Local Business Zone – clause 14.4 Development Standards for Buildings and Works.

Objective	To provide opportunity for landscaping and site drainage
Acceptable Solutions	**Performance Criteria**
A1 An area not less than 10% of the total area of the lot is to be landscaped.	**P1** Landscaping must be implemented that provides for partial screening from nearby residential properties, as well as implementing water sensitive urban design measures.

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SOR-S5.8.1 Lot design

This clause is in substitution to the Local Business Zone – clause 14.5.1 Lot design

Objective:	That each lot: (a) has an area and dimensions appropriate for use and development in the specific area plan; and (b) is provided with appropriate access to a road.
Acceptable Solutions	**Performance Criteria**
A1 Each lot, or a lot proposed in a plan of subdivision, must: (a) have an area of not less than 2000m^2 and: (i) be able to contain a minimum area of 30m x 30m clear of: a. all setbacks required by Clause SOR-S5.7.1 A1 and A2; b. all setbacks required by Clause 14.4.2 A2	**P1** Each lot, or a lot proposed in a plan of subdivision, must have sufficient useable area and dimensions suitable for its intended use, having regard to: (a) the relevant requirements for development of buildings on the lot; (b) existing buildings and the location of intended buildings on the lot; (c) the topography of the site; (d) the presence of any natural hazards; and

c. easements or other title restrictions that limit or restrict development; and (ii) existing buildings are consistent with the setback required by Clause SOR-S5.7.1 A1, A2 and 14.4.2 A2; (b) be required for public use by the Crown, a council or a State authority; (c) be required for the provision of Utilities; or (d) be for the consolidation of a lot with another lot provided each lot is within the same zone.	(e) the pattern of development existing on established properties in the area.

A2 Each lot, or a lot proposed in a plan of subdivision, must have a frontage of not less than 25m.	**P2** Each lot, or a lot proposed in a plan of subdivision, must be provided with a frontage or legal connection to a road by a right of carriageway, that is sufficient for the intended use, having regard to: (a) the efficient utilization of land; (b) the topography of the site; (c) the size and shape of the site; (d) the functionality and useability of the frontage; (e) the anticipated nature of vehicles likely to access the site; (f) the ability to manoeuvre vehicles on the site; and (g) the ability for emergency services to access the site.
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SOR-S5.8.2 Subdivision Landscaping

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Objective:	To ensure a high standard of appearance across the plan area.
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Objective:	To provide for the safe and efficient movement of vehicles.
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	(c) the minimization of internal lots.

SOR-S5.8.4 Stormwater Management

This clause is in substitution to the Local Business Zone – clause 14.5.2 Services A3 and P3

Objective:	To provide for treatment of stormwater quality and quantity.
Acceptable Solution	**Performance Criteria**
A1 On-site detention devices must be incorporated in the development so that the flow rate of stormwater outside the boundaries of the title is no greater than if the land was used for rural purposes.	**P1** Stormwater may only be discharged from the site in a manner that will not cause an environmental nuisance, and that prevents erosion, siltation or pollution of any waterways, coastal lagoons, coastal estuaries, wetlands or inshore marine areas, having regard to: (a) the intensity of runoff that already occurs on the site before any development has occurred for a storm event of 1% Annual Exceedance Probability (pre-development levels); (b) how the additional runoff and intensity of runoff that will be created by the subdivision for a storm event of 1% Annual Exceedance Probability, will be released at levels that are similar to those identified at the pre-development levels of the subdivision;

	(c) whether any on-site storage devices, retention basins or other Water Sensitive Urban Design (WSUD) techniques are required within the subdivision and the appropriateness of their location; (d) overland flow paths for overflows during extreme events both internally and externally for the subdivision, so as to not cause a nuisance.

1 Old Forcett Road, Dodges Ferry

SWMP Report (Re-Zoning)

Prepared For: Woolcott Surveys

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1. Introduction

Flüssig Engineers have been engaged by **WOOLCOTT SURVEYS** to undertake a site-specific Stormwater Management Plan (SWMP) for a proposed rezoning development at number 1 Old Forcett Road, Dodges Ferry in the **Sorell Municipality**. The report is designed to provide guidance and recommendations around the feasibility of rezoning the current lot to an Industrial Zone. This report includes, but not limited to, lot drainage analysis including stormwater drainage, MUSIC modelling to stated stormwater quality standards and flood hazard from a major storm. The purpose of this report is to determine the feasibility of the proposed use should the land be rezoned.

1.1 Objectives and Scope

This analysis has been written to address the standards of the Sorell Council Interim Planning Scheme 2015 (SIPS), with the intent of understanding the intended development stormwater management and flooding characteristics. The objectives of this study are:

- Provide an assessment of the sites flood characteristics under the combined 1% AEP plus climate change (CC) scenario.
- Provide comparison of flooding for pre- and post-development against acceptable and performance criteria.
- Provide stormwater quantity analysis for the desired development for the 2% AEP design storm scenario.
- Provide stormwater quality analysis for the desired development scenario.
- Provide recommendations as they pertain to flooding and stormwater management issues, for a potential rezoning and future light industrial development, where appropriate.

1.2 Limitations

This study is limited to the objectives of the engagement by the clients, the availability and reliability of data, and including the following:

- The flood model is limited to a 1% AEP + CC worst case temporal design storm.
- Quantity analysis is limited to the 2% AEP worst case temporal design storm for the site.
- All parameters have been derived from best practice manuals and available relevant studies (if applicable) in the area.
- All provided data by the client or government bodies for the purpose of this study is deemed fit for purpose and has not been checked for accuracy.
- The study is to determine the possible effects of the new development on stormwater management/flooding characteristics. This to provide insight into the feasibility of the proposed rezoning and should not be used as a full study into future design without further assessment.

2. Model Build

2.1 Overview of Catchment

The contributing catchment for 1 Old Forcett Road is approximately 163 ha, draining from approximately 160 mAHD from above Dodges Hill Road to 4 mAHD at the site. The land use is predominantly rural resource with a section of the upper catchment zoned as rural living. The specific site is classified under rural resource, proposed to be rezoned as industrial.

Figure 1 below outlines the approximate contributing catchment for the 1 Old Forcett Road.

Figure 1. Contributing Catchment, 1 Old Forcett Road, Dodges Ferry

2.2 Hydrology

The upper catchment was modelled using Infoworks ICM hydrology (RAFTS) module, which uses the Australian designed Laurenson method to calculate runoff. The catchment characteristics (% impervious, roughness etc.) were taken from best practice manuals. The hydrology catchment was connected to the 1D-2D hydraulic model.

The following Table 1 states the adopted hydrological parameters for the RAFTS catchment.

Table 1. Parameters for RAFTS catchment

Catchment Area (ha)	Initial Loss Perv/Imp (mm)	Continuing Loss Perv/Imp (mm/hr)	Manning's N Pervious	Manning's N Impervious	Non-linearity Factor
163	29/1	3.7/0.0	0.045	0.020	-0.285

2.2.1 Design Rainfall Events

SIPS 2015 requires modelling of flood events of 1% AEP (100yr ARI) for the life of the development. Therefore, the design events assessed in this analysis are limited to the 1% AEP + CC and 2% AEP design events. Due to the size and grade of the catchment the peak rainfall time was restricted to between 10 min – 24 hrs.

The model ran each duration for each design event against 10 temporal patterns sourced from the ARR data hub. ARR 2019 advises the use of the worst-case duration median temporal pattern to ensure the event is not too conservative. These events were run through a hydrologic model to determine the required storm event. Figure 2, shows the box and whisker output of the model run. The model shows that the 1% AEP 4.5-hour storm temporal pattern 5 was the worst-case median storm event.

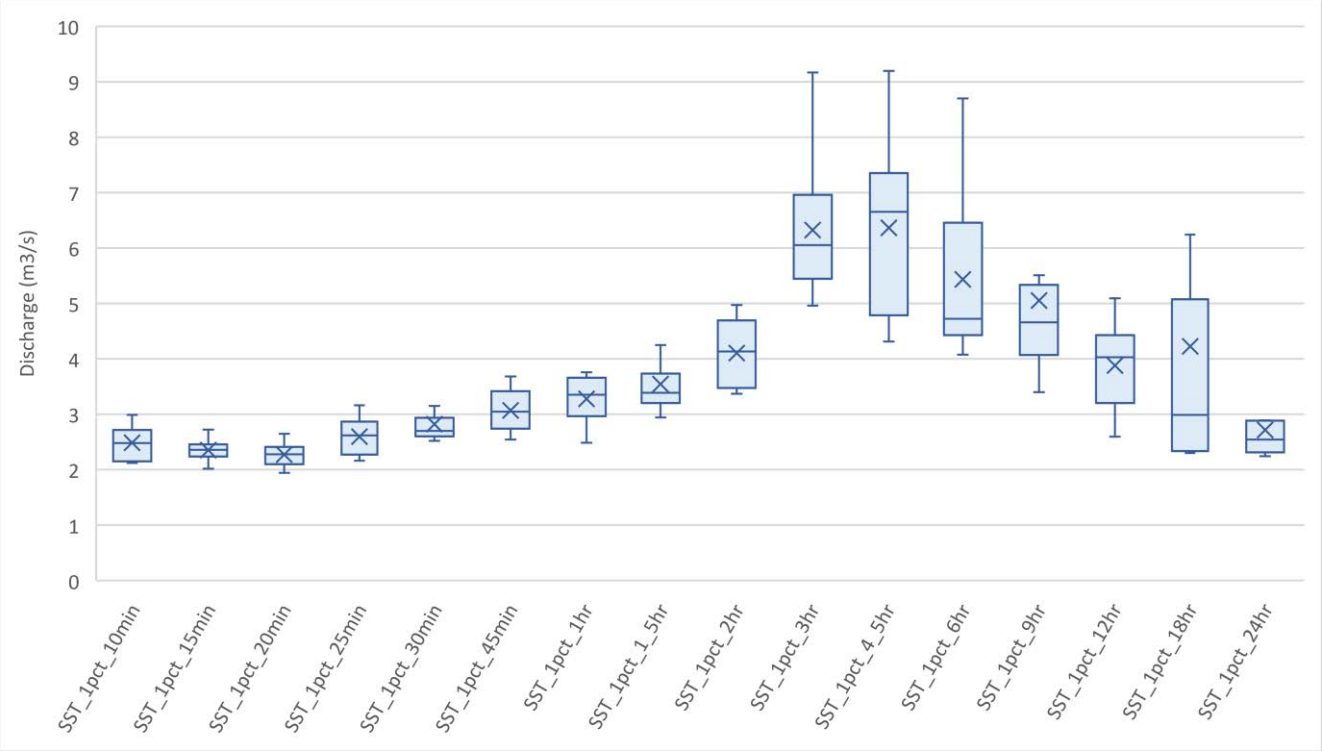


Figure 2. 1% AEP Box and Whisker Plot

2.2.2 Climate Change

As per ARR 2019 Guidelines, for an increase in rainfall due to climate change at 2100, it is recommended the use of RCP 8.5. Table 2 shows the ARR 8.5 increase of 16.3% that was used within the model.

Table 2. Climate Change Increases

Sub-Catchment	ARR 8.5 increase @ 2100
1 Old Forcett	16.3%

2.3 Hydraulics

A 1D-2D hydraulic model was created to determine the flood level through the target area.

2.3.1 Extents and topography

The proposed rezoning extends from Old Forcett Road into the original property by approximately 330m along Carlton River Road. The site is predominately open field and has an average gradient of approximately 5.7%.

2.3.2 Calibration/Validation

This catchment has no stream gauge to calibrate the model against a real-world storm event. Similarly, there is limited historical information available, and no past flood analysis undertaken to validate against the flows obtained in the model. Therefore, best practise parameters from ARR2019 were used within the model.

2.3.3 Boundary Conditions

Given the sites proximity to Okines Beach the downstream boundary was set along the beach. The tail water level was set to the highest astronomical tide level including sea level rise at 2100, taken from SIPS, which is shown in Table 3.

Table 3. Adopted Tide and Storm Surge Level (mAHD)

Scenario	Highest Astronomical Tide (mAHD)	2100 Sea Level Rise (m)	HAT + SLR (mAHD)
1% AEP	0.85	+0.84	1.69

2.3.4 Survey

The 2D surface model was taken from a combination of Greater Hobart LiDAR 2013 (Geoscience Australia) to create a 1m cell size DEM. For the purposes of this report, 1m cells are enough to capture accurate flow paths. The DEM with hill shading can be seen below (Figure 3).

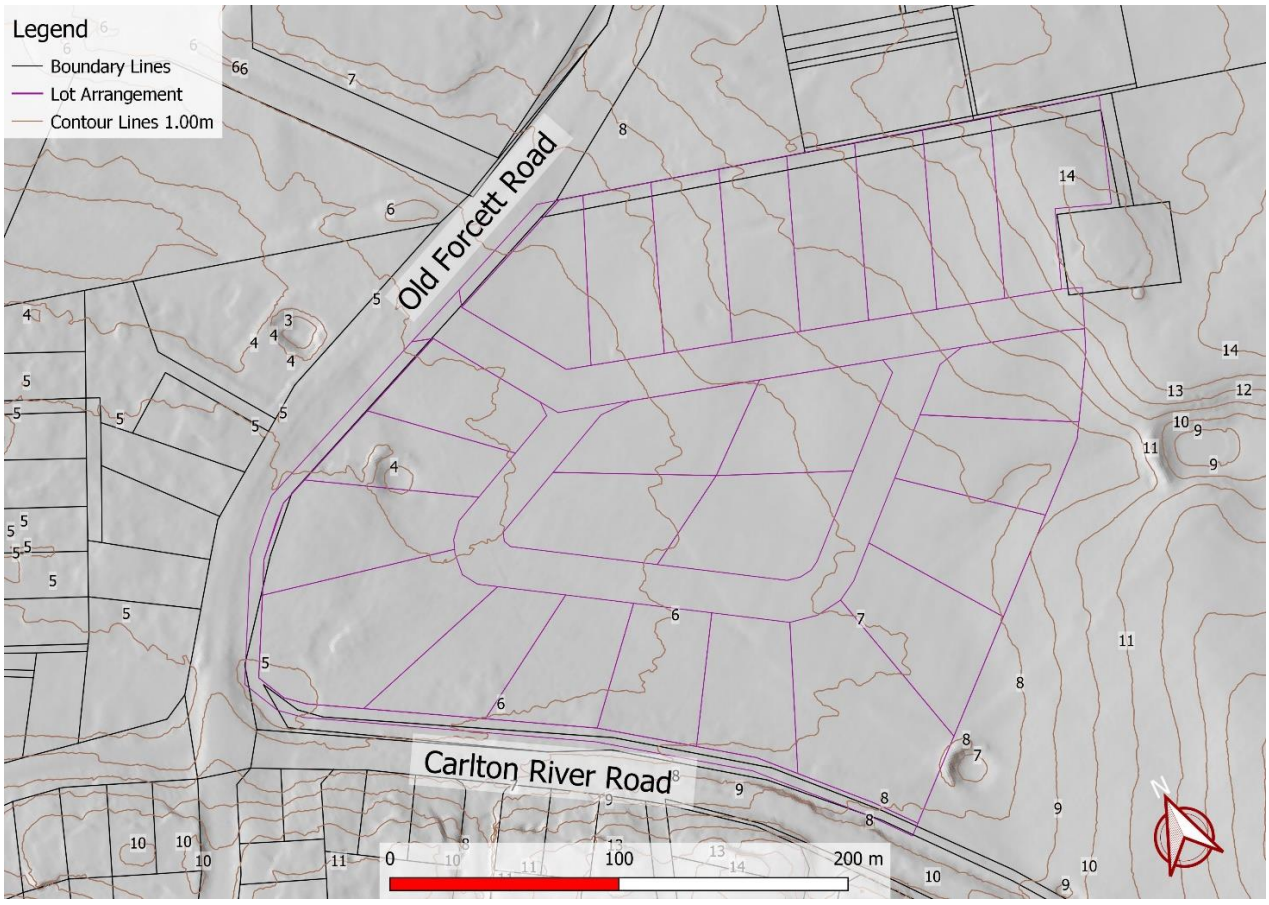


Figure 3. 1m DEM (Hill shade) of Lot Area

2.3.5 Roughness (Manning's n)

Roughness values for this model were derived from the ARR 2019 Guidelines. The Manning's values are listed in Table 4.

Table 4. Manning's Coefficients (ARR 2019)

Land Use	Roads	Open Channel	Rural	Residential	Parks	Buildings	Piped Infrastructure
Manning's n	0.018	0.035	0.04	0.045	0.05	0.3	0.013

2.3.6 Walls

All significant fences and retaining structures were included as 2D linear wall structures within the 2D model.

2.3.7 Buildings

Buildings were represented as mesh polygons with a high Manning's n value within the model. Buildings with unknown floor levels were set with a minimum 300mm above ground.

This method allows for flow through the building if the flood levels/pressure become great enough. The aim is to mimic flow through passageways such as doors, windows and hallways.

2.4 Development Runoff

Stormwater runoff from the development site has been assessed under pre- and post-development models to determine the potential impact rezoning and potential future development at 1 Old Forcett Road has on the immediate local flows. As per planning guidelines it is a requirement that this does not have a negative impact from pre to post development.

Site characteristics for the pre- and post-development model are summarised in Table 5.

Table 5. Site Characteristics

Land Use	Pre-Development		Post-Development	
	Area (ha)	% of total land	Area (ha)	% Impervious
Total Pervious	1.66	20.00%	7.48	90.00%
Total Impervious	6.65	80.00%	0.83	10.00%

2.5 Model Results

The result of 1% AEP + CC were run through the pre-development and post-development model scenarios to compare the changes to flooding onsite and to surrounding properties. It can be seen from the pre-development model runs (Figure 4), that significant flooding occurs through the lot and re-entry into the existing creek through the neighbouring properties.

Any proposed future subdivision of the rezoned land must be able to provide a safe overland flow path through the site. Figure 5 shows it is possible to provide such safe overland flow path via specifically designed channels and roads aligned as near as possible to the existing low points.

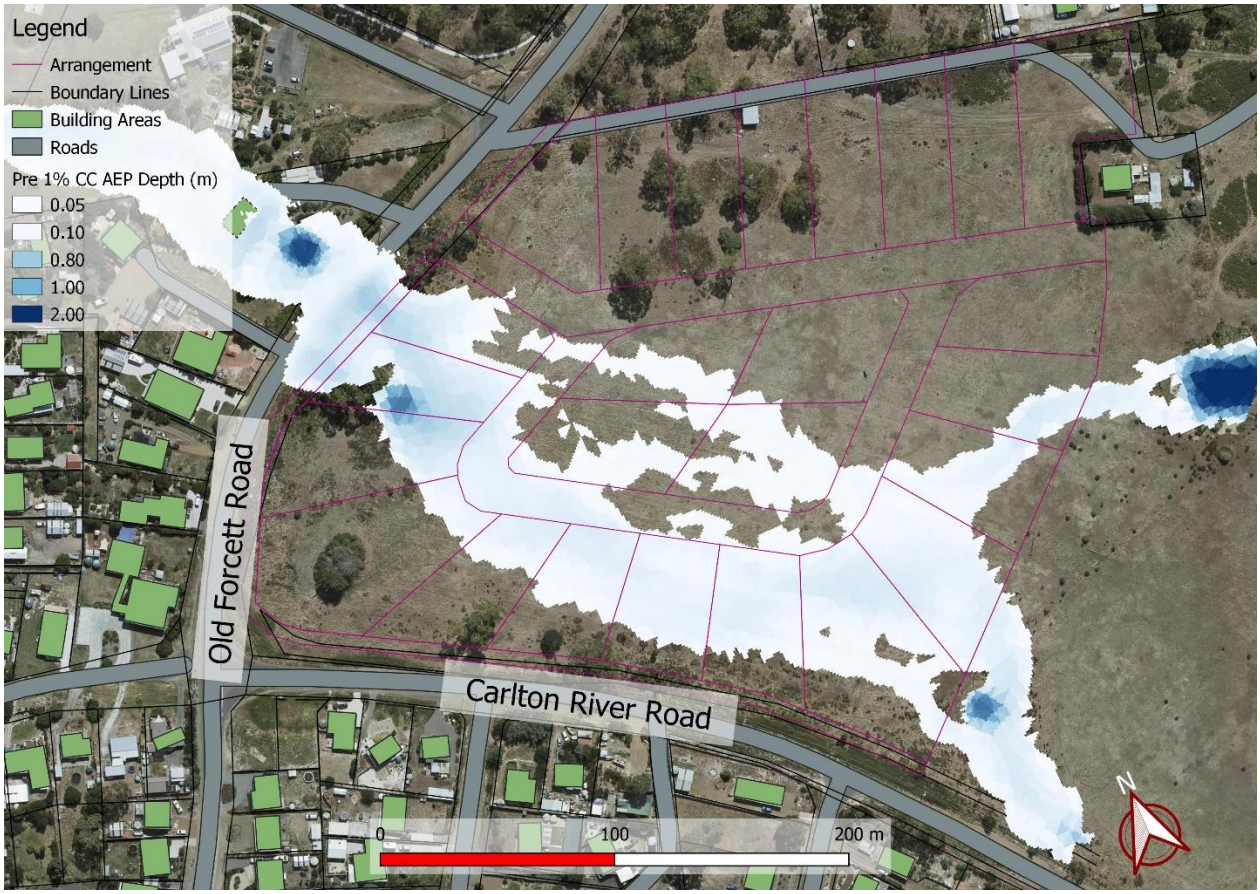


Figure 4. Pre-development 1%+CC flood depths and extents

Figure 5. Post – Development 1%+CC flood depths and extents

2.5.1 Displacement of Overland Flow on Third Party Property

Figure 5 shows post-development flows that, when compared against pre-development, shows that the likely subdivision to occur from rezoning could feasibly control the major overland flow through reserves and roads and provide a discharge similar if not exactly matching pre-development model. It is further evident from the comparison that, there is no increase in flood extents or discharge on third party properties with the post-development model.

2.5.2 Development Effects on Stormwater Discharge

Figure 6 below shows the discharge hydrograph for the proposed rezoning and future development area only. The graph was captured in the model for both pre- and post-development runs and combined in graph format to demonstrate the change in net discharge. It demonstrates that the difference in peak flow from the pre-development 7.67m³/s to the post-development of 7.33 m³/s, showing a slight reduction in peak flow but ultimately negligible difference in overall hydrograph. This can be achieved by utilising the proposed dams upstream and within the proposed site to control the increase in runoff and the quantity contribution from upstream via an increase in dam size upstream of site.

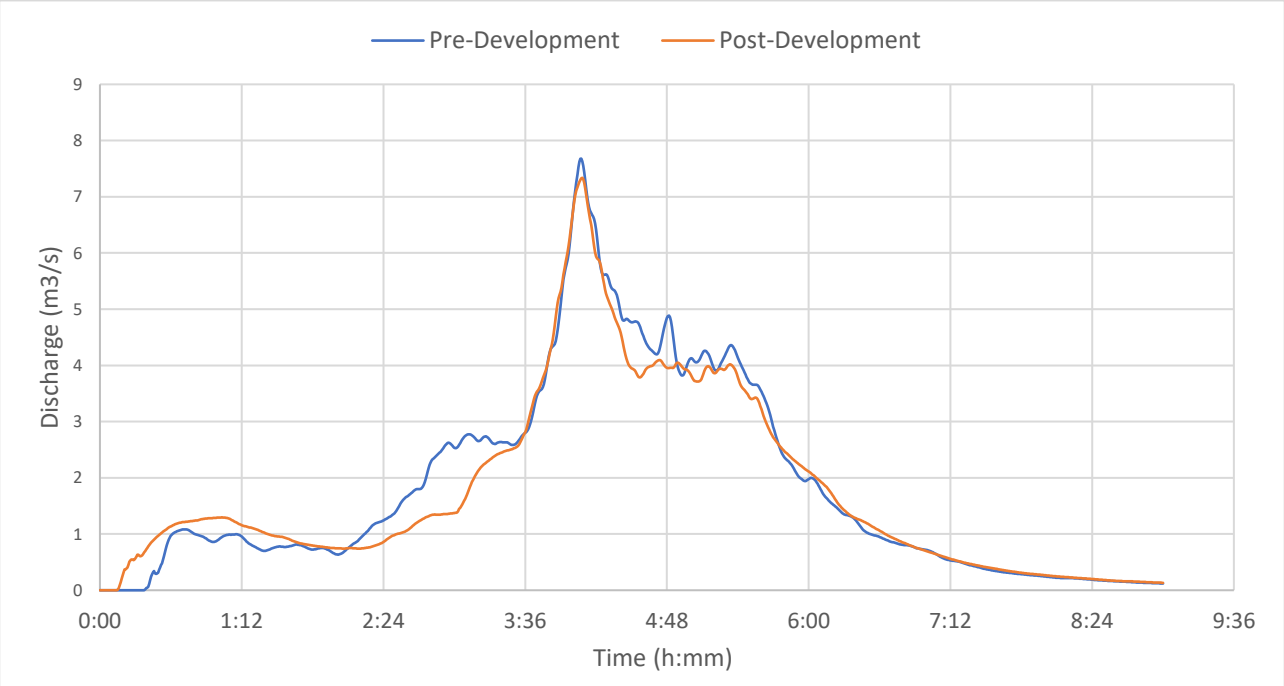


Figure 6. Pre and Post Development Net Discharge 1% +CC

3. Flood Hazard

The location of the rezoning and subsequent subdivision is subject to be inundated to <300mm flood depth and <2.0m/s velocity (Figure 8). This places the hazard rating as adopted by Australian Flood Resilience and Design Handbook as a H1 – Generally safe for people, vehicles and buildings as shown in Figure 7.

Therefore, in the event of flooding, reasonable lot allocations can achieve building envelopes for light industrial real estate, free from inundation.

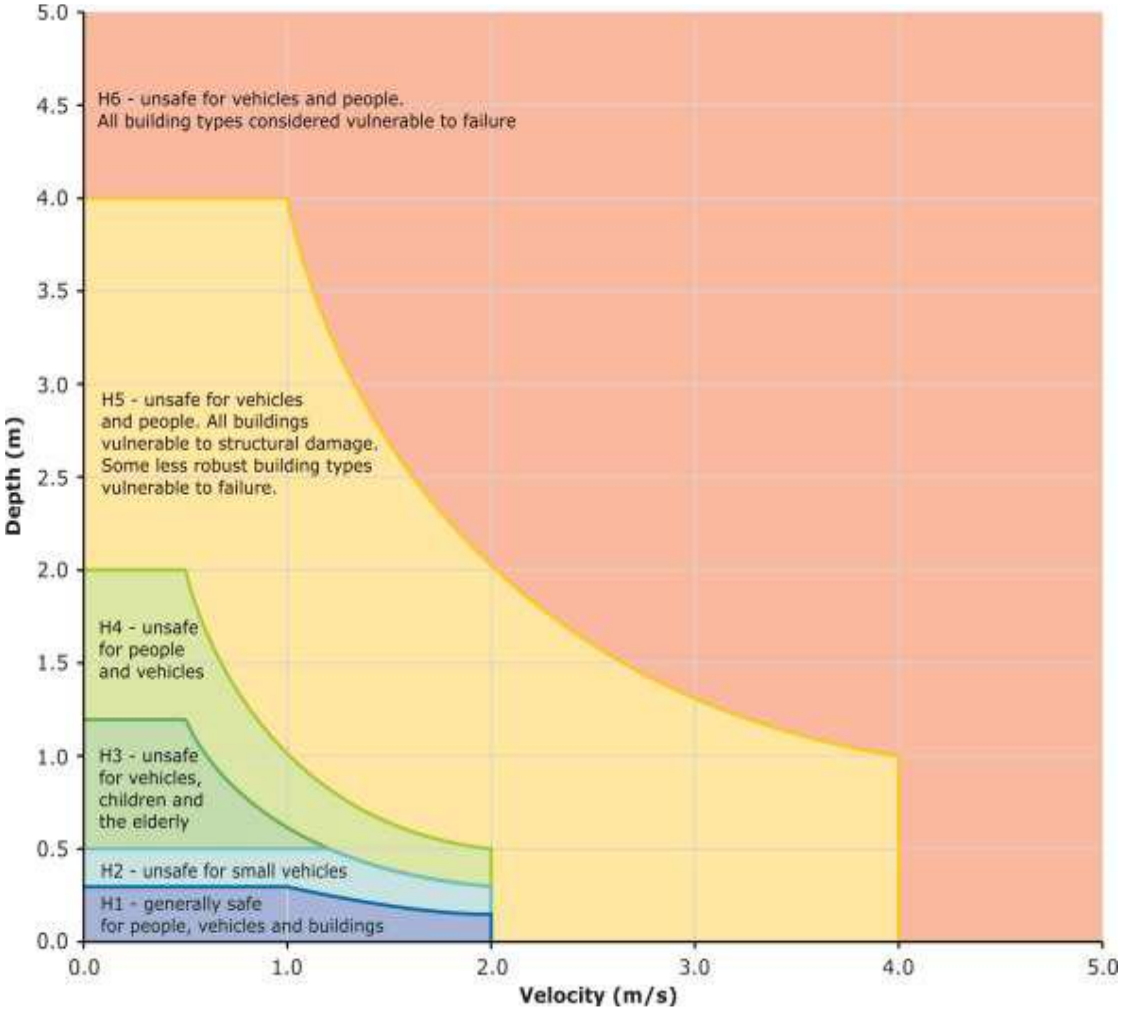


Figure 7. Hazard Categories, Australian Disaster and Resilience Handbook

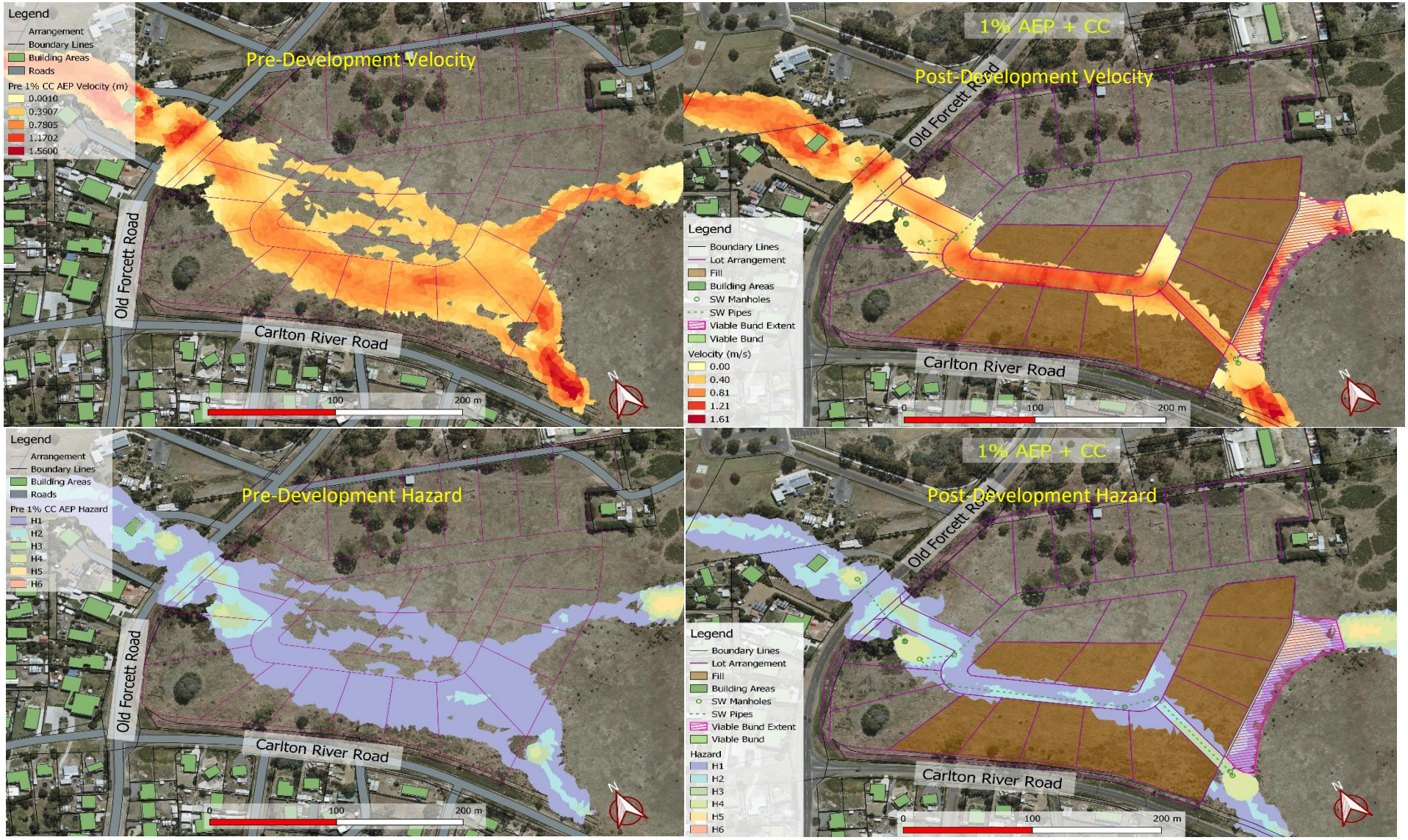


Figure 8. Pre- and post-development velocity (top) and hazard (bottom) maps

4. Stormwater Quantity for Potential Future Development

4.1 Land use

Pervious and impervious land use for the development both pre- and post-development were derived from plans and aerial imagery. Land use values are as follows in Table 6.

Table 6. Site Characteristics

Catchment	Area (ha)	Average Slope (%)	Total Land use pervious/ impervious (ha)	Storm duration and pattern
Pre-Development	8.31	5.7	6.65/1.66	2% 10-minute storm pattern 7
Post-Development	8.31	5.7	0.83/7.48	2% 10-minute storm pattern 7

4.2 Design Intensity Storms

Design storm durations and temporal patterns were calculated using Australian Rainfall and Runoff 2019 (ARR19) guidelines, running ten temporal pattern events through each duration to determine the worst-case duration using the median temporal pattern.

The potential future development was assumed based on surrounding infrastructure and proposed planning scheme allowance. Total impervious area was assumed to be worse case 90% impervious.

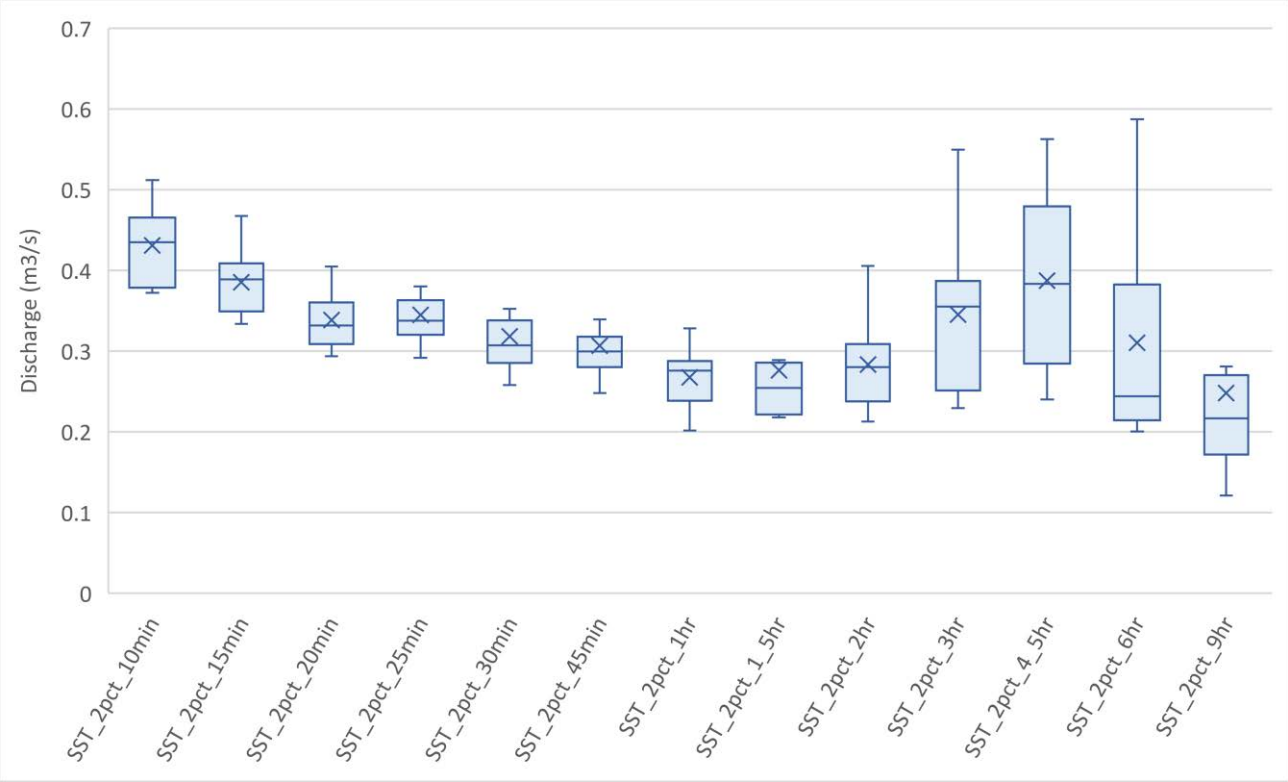


Figure 9, 2% AEP Box and Whisker (site only)

4.3 Manning's n and soil losses

Losses for this catchment were derived from ARR19 data hub (see Table 7 for loss values). Manning's n values were taken directly from best practice manuals as shown in Table 8.

Table 7. Runoff Coefficients

Surface	Initial losses (IL) mm	Continuing Losses (CL) mm/ hr
Pervious	29	3.7
Impervious	1	0

Table 8. Manning's N coefficients

Land Use	Manning's n
Swale Channel	0.025
Road	0.018
Gravel	0.025
Urban Yards	0.045
Buildings	0.3

4.4 Development Runoff

Stormwater runoff from the development site has been assessed under proposed future pre- and post-development models to determine the potential impact the development at 1 Old Forcett Road has on the immediate local flows. As per planning guidelines it is a requirement that this does not worsen from pre to post development.

Using the above parameters, the site was calculated using Infoworks ICM software and ARR19 best practice manuals. Site characteristics for the pre- and post-development model were summarised in Table 6.

4.5 Model Results

The pre- and post-development scenarios were calculated using Infoworks ICM software against the 2% AEP. The storm durations were derived from the worst case median temporal pattern for these two events which were both 10 minutes duration.

The pre and post conditions can be seen in Table 9 below showing the peak discharge and increase in peak discharge from pre to post development.

Table 9. Discharge rates pre- and post-development

Design Event (AEP)	Peak Discharge (L/s) based in 260m2 Impervious Development Areas		Difference (L/s)
	Pre-Development	Post- Development	
2%	450	2,012	1,562

As per the Sorell Council Interim Planning Scheme 2015, E7.0 (Stormwater Management) the post-development allowable site discharge must not exceed the pre-development site discharge. As can be seen from Table 9, this is exceeded in the 2% AEP by a peak discharge of 2,012 L/s, an exceedance of 1,562 L/s above the allowable site discharge of 450 L/s. Therefore, the site must detain the difference using an onsite stormwater detention (OSD) system.

4.6 On-Site Detention Sizing and Configuration

Figure 10, shows the total difference in runoff volume as the area between the pre- and post-development hydrograph where it is shown that there is an increase in flow from the site. A single individual 750,000 L detention tank has been provided to detain the flow volume and maximum discharge of post development flow.

Figure 10, site runoff pre- vs post-development

The detention will drain via 600mm outlet pipe into stormwater network (natural creek), to maintain a pre-development peak discharge including upstream catchments.

4.7 Maintenance

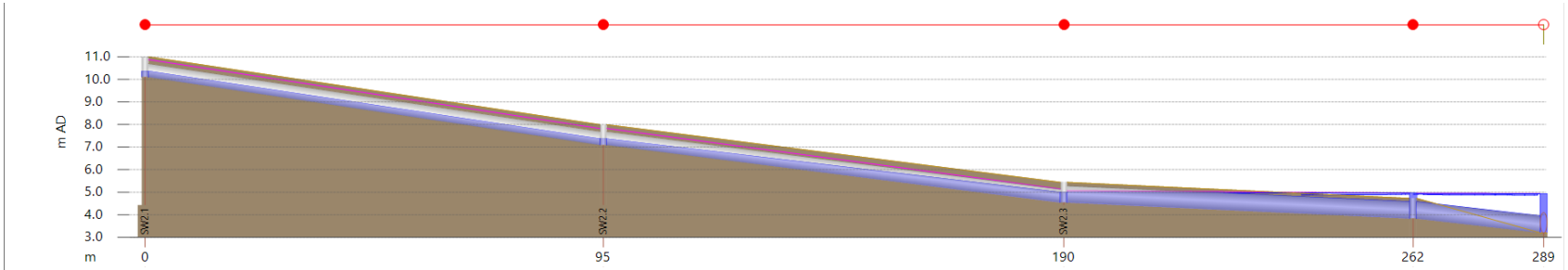
To ensure ongoing operation of any proposed detention regular maintenance schedule is required to ensure the detention pond remains in good working order. This would be required to be shown in any detailed design for subdivision planning application.

4.8 Stormwater Infrastructure

As per the planning scheme any possible proposed industrial subdivision is required to provide a minor storm drainage system capable of draining the 2% AEP storm event from a fully developed lot. Figure 11, shows a possible design for the likely proposed subdivision that would be suitable to drain a fully developed lot. In the proposed design the upper half of the lots including the road reserve drain to a DN600 pipe within the proposed road reserve (Figure 12) and the lower lots and upper dam drains via a DN900 to detention. As this is a feasibility design to show drainage is a possibility for the purpose of rezoning any final proposed design should size the infrastructure accordingly.

Additionally, modifications to the access road are required to provide an overland flow path at, as close as possible, to the existing channel line. Providing a road as the overland flow path reduces the burden on the proposed lot and reduces overall risk top future structures. Furthermore, increasing capacity of the upstream dams will provide better control over the contributing runoff from the upstream catchment Figure 12.

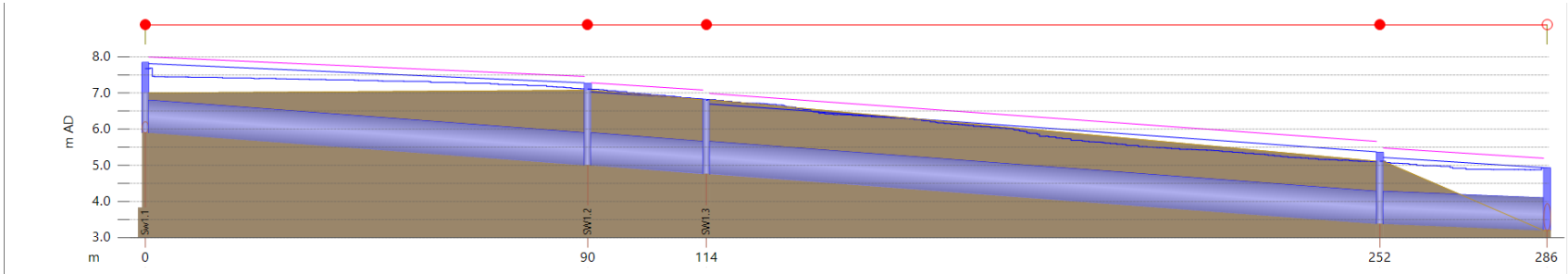
Figure 11, Minor Drainage system 2% AEP



Link	SW2.1.1	SW2.2.1	SW2.3.1	SW2.4.1
length (m)	94.6	95.0	72.1	26.9
width (mm)	600	600	750	750
us inv (m AD)	10.097	7.091	4.539	3.829
ds inv (m AD)	7.091	4.539	3.829	3.200
US flow (m3/s)	0.36879	0.36879	0.36846	0.35938
US total head (m AD)	10.870	7.823	5.068	4.955
US velocity (m/s)	3.180	3.018	2.021	2.221
DS flow (m3/s)	0.36879	0.36851	0.36680	0.44209
DS total head (m AD)	7.821	5.143	4.966	4.940
DS velocity (m/s)	3.010	2.351	1.878	2.045

Node	SW2.1	SW2.2	SW2.3	SW2.4	SW1.5
ground (m AD)	10.997	7.991	5.439	4.729	3.200
Ch floor lev (m AD)	10.097	7.091	4.539	3.829	3.200
flood dep (m)	-0.642	-0.632	-0.448	0.228	1.733

Figure 12, Long Section northern pipe section



Link	Sw1.1.1	SW1.2.1	SW1.3.1	SW1.4.1
length (m)	90.2	24.1	137.3	34.0
width (mm)	900	900	900	900
us inv (m AD)	5.900	5.000	4.759	3.380
ds inv (m AD)	5.000	4.759	3.380	3.200
US flow (m3/s)	1.35418	1.58375	1.62106	1.54583
US total head (m AD)	7.996	7.280	6.987	5.479
US velocity (m/s)	2.643	2.731	2.727	2.300
DS flow (m3/s)	1.35367	1.58369	1.62068	1.54579
DS total head (m AD)	7.459	7.084	5.661	5.197
DS velocity (m/s)	2.207	2.581	2.391	2.307

Node	Sw1.1	SW1.2	SW1.3	SW1.4	SW1.5
ground (m AD)	7.000	7.074	6.811	5.112	3.200
Ch floor lev (m AD)	5.900	5.000	4.759	3.380	3.200
flood dep (m)	0.843	0.188	0.010	0.246	1.733

Figure 13, Long Section southern pipe section

4.9 Quantity Summary

This concept quantity report is based off limited available information and guidelines from the Sorell Council in line with the Tasmanian Interim Planning Scheme. The following is a summary of the concept requirements for stormwater management for the development at 1 Old Forcett Road, Dodges Ferry:

1. Maximum developed site exceeds allowable discharge by 1562 L/s for the 2% AEP.
2. Recommended onsite storage of 750,000 L for the 10 min storm duration.
3. New subdivision must be constructed to provide overland flow path and direct the 1% AEP runoff around development sites as shown in this document or similar.
4. Stormwater drainage system can be designed to cater for site runoff at 2% AEP.

5. Stormwater Quality

Water quality modelling for the site has been undertaken with the urban stormwater improvement. conceptualisation software MUSIC. The modelling conducted in MUSIC has been done in accordance with MUSIC Modelling Guidelines (BMT WBM, August 2019) and the Tasmanian State Stormwater Strategy. This document provides a guide to water quality modelling methodology and outlines the assumptions that should be made when selecting input parameters.

Recommendations for the improvement of the water quality on site would include the diversion of stormwater flows from the subdivision to a primary and secondary treatment (treatment train). This would reduce the pollutants in the receiving waters further downstream and be a safe design option if future usage of this sub catchment provides higher pollutant storm water runoff.

5.1 Stormwater Quality Treatment (Construction phase)

During construction, many pollutants are generated from various sources. These pollutants can easily be captured in stormwater runoff and introduced into the downstream receiving environment, polluting the waterways. Some of the main construction phase pollutants are described below:

- Litter from construction – Material packaging, paper, plastic, food packaging, off cuts etc.
- Sediment erosion and transports from excavated material and fresh surfaces.
- Hydrocarbons – equipment and machinery
- Toxic material – cement, solvents, paints, cleaning agents etc.
- pH altering substances – cement, cleaning agents etc.

Construction phase pollutants should be planned and mitigated for by a designed site-specific SWMP as part of the drawing set. This should detail controls including, but not limited to:

- Diversion of upslope water (where applicable)
- Stabilised exit/entry points
- Minimise site disturbance where possible.
- Implement sediment control along downslope boundaries.
- Appropriate location and protection for stockpiles
- Capture on-site runoff that may contain pollutants.
- Maintain control measures.
- Stabilise site after disturbance (revegetate etc)

5.2 Stormwater Quality Modelling

Stormwater pollutant modelling for Old Forcett Rd development was undertaken using Model for Urban Stormwater Improvement Conceptualisation (MUSIC) software, version 6.3.0 under the guidelines of the State Stormwater Strategy and Interim Planning Scheme.

This model splits the catchment into the following typical areas:

- Roof Catchment
- Road Catchment
- Driveways
- Revegetated land

The following fraction impervious and land areas were adopted in the modelling as per the concept design measurements. Revegetated land was left to freely drain to the node as there is no mechanism to drain this area to a treatment device. See Table 10 below for fraction imperviousness (fi).

Table 10. Adopted Fraction Impervious

Catchment Area (ha)	Roof		Road/Driveways		Revegetated	
	Area (ha)	fi	Area (ha)	fi	Area (ha)	fi
8.33	0.72	1	4.76	0.9	2.83	0

5.3 Council Planning Quality Removal Standards

The Sorell Council Interim Planning Scheme 2015 has adopted the pollutant removal targets and best practice from the State Stormwater Strategy 2010. See Table 11 for target removal rates.

Table 11. State Stormwater Strategy Pollutant Removal Targets

Parameter	Result Pollutant Retention on Developed Site
Total Suspended Solids (TSS) (kg/yr)	80%
Total Phosphorous (TP) (kg/yr)	45%
Total Nitrogen (TN) (kg/yr)	45%
Total Pollutants (kg/yr)	100%

5.4 Treatment Train

To achieve stormwater pollutant removal targets outlined above and considering site constraints, this model utilised a primary and secondary treatment. The treatment train consists of a primary gross pollutant trap, followed by a wetland/detention combination which receives flow from new ground, impervious areas, and roofs.

5.5 Quality Results

The MUSIC pollutant load reductions can be seen detailed in Figure 15 below. When comparing the MUSIC results to the required state stormwater strategy target load reductions in Table 12, all targets either meet or exceed reduction targets.

Table 12. Pollutant Removal Achieved vs Targets.

Parameter	Required Load Reduction (%)	MUSIC Modelled Load Reduction (%)	State Stormwater Targets Achieved
Total Suspended Solids (TSS) (kg/yr)	80.0	90.5	Y
Total Phosphorous (TP) (kg/yr)	45.0	74.0	Y
Total Nitrogen (TN) (kg/yr)	45.0	54.2	Y
Total Pollutants (kg/yr)	100.0	100	Y

Based on the water quality assessment using the MUSIC software, it is found that the pollutant reduction improvement can be achieved by adopting the Stormwater Quality Improvement Devices (SQIDs) specified in Table 13.

Table 13. Required SQIDS

Stormwater Quality Improvement Device	Quantity
Spel Ecosystem	1
Wetland	1

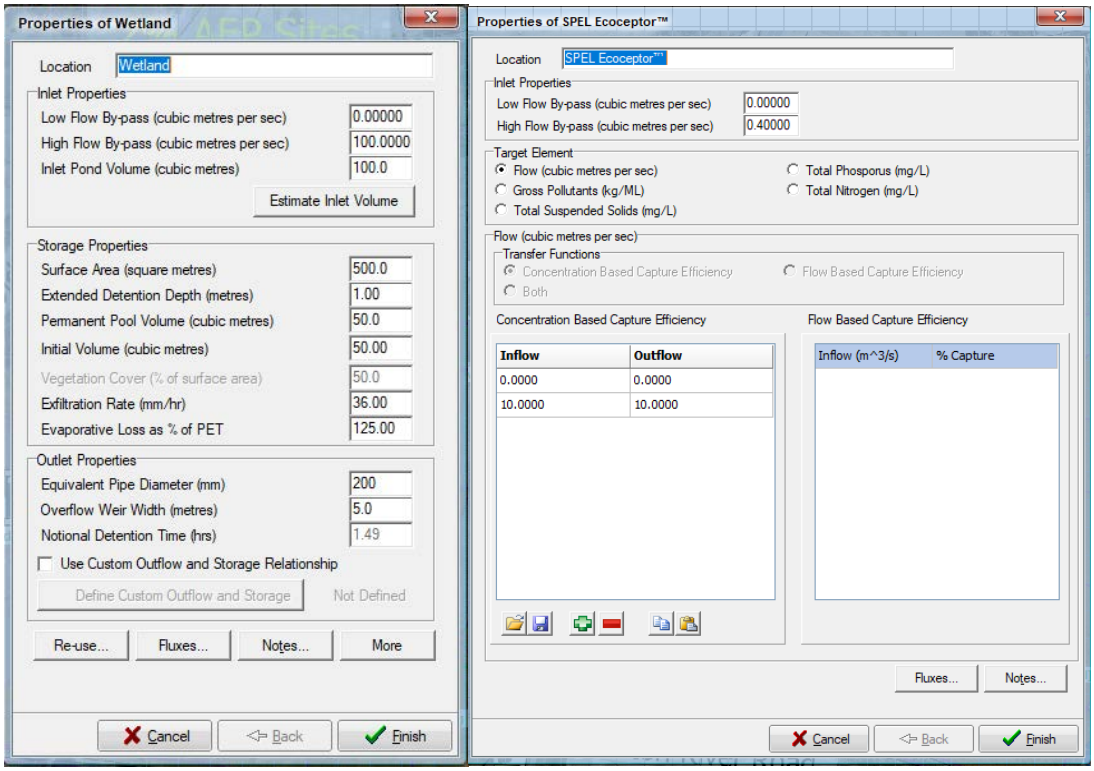


Figure 14. Treatment Properties

Figure 15. Music Model Treatment Train and removal statistics

5.6 Proposed Wetland/Detention combination

To achieve the required detention and treatment efficiencies for an industrial development, such as the one outlined above, we would propose to incorporate a combined wetland/detention design where the low flow to the detention would be treated by the wetland whilst the minor storm event would flood the wetland providing the required storage above the wetland (Figure 16). This would also require maintenance to clean and repair the wetland after any storm event to ensure it remains in working order.

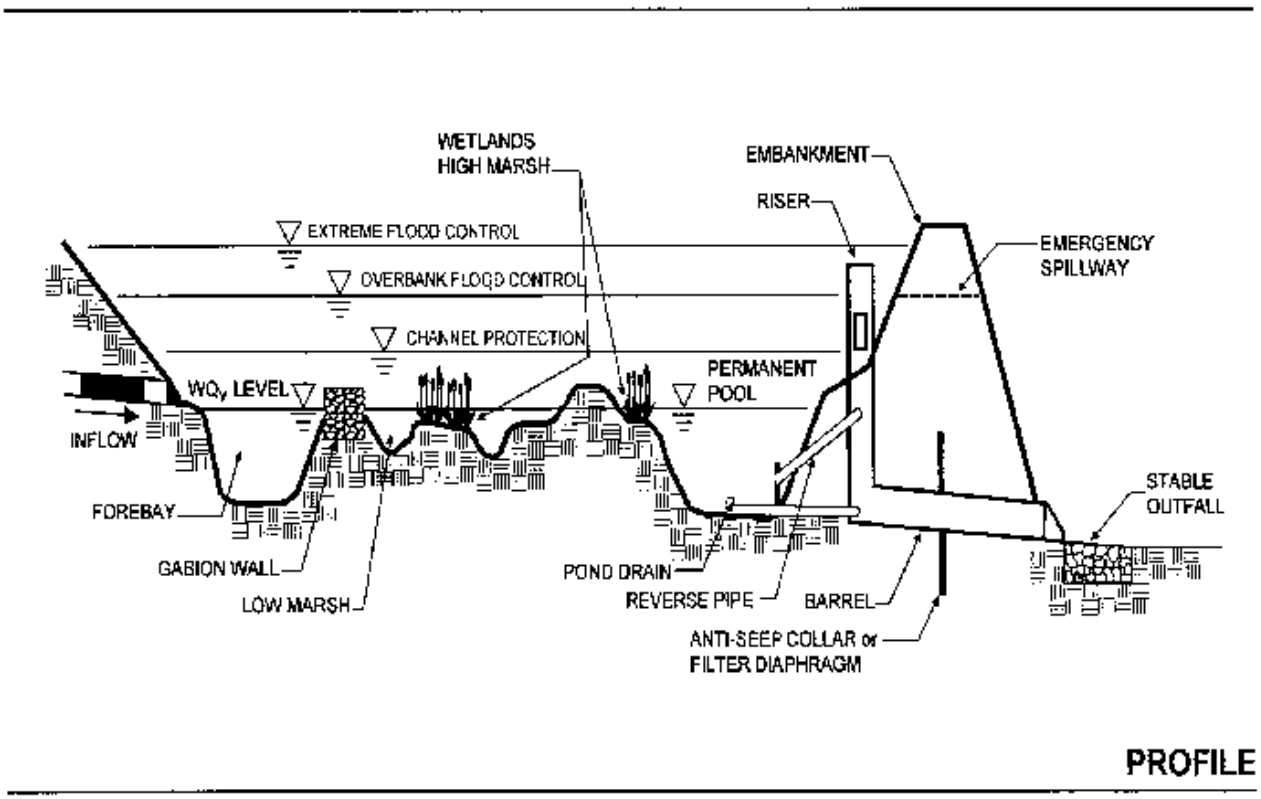


Figure 16. Example wetland detention combination.

5.7 SQID Maintenance

To ensure ongoing operation of all treatment systems, regular maintenance on all treatment devices is required to ensure they remain in good working order. This would need to be provided with the proposed design at subdivision planning stage.

5.8 Quantity Summary

This concept quality report is based off limited available information and guidelines from the Sorell Council in line with the Tasmanian Interim Planning Scheme and state stormwater strategy. The following is a summary of the concept requirements for stormwater management for the development at 1 Old Forcett Road, Dodges Ferry:

1. Treatment can be met using a combination of GPT and wetland.
2. To best utilise space, a combined detention/ treatment(wetland) design is likely provide the best solution for treatment.

6. Conclusion

The Concept Stormwater Management Plan for 1 Old Forcett Road development site has reviewed the potential post development quantity scenarios for the purpose of suitability of rezoning to industrial land under the SIPS 2015. Post-development quantity/quality has been assessed against the State Stormwater Strategy to ensure the post-development flows meet specified standards.

The following conclusions were derived in this report:

1. A comparison of the pre- and post-development peak flows for the 1% AEP shows that, with a diversion of the overland flow path (OFP), a development can provide all lots except the dedicated detention lot that are free from inundation with a sizable building area, access, and its services.

2. Peak discharge is controlled through the detention pond and has been shown to provide a negligible reduction between pre- and post-development flood scenarios.

3. Velocity pre- and post-development remains consistent downstream of the development. However, flow through the development is concentrated in the designated OFP reserves during the post development.

4. Hazard from flooding in the area remains predominately H1 post development scenario, with predominately H1 for pre-development. However, detention lot for the post-development shows higher hazard (up to H5) localised to the detention pond.

5. A comparison of the post-development peak flows for the 2% AEP storm event were undertaken against the allowable discharge and found to meet the allowable discharge using on-site detention (OSD) measure which includes a 750.0kL detention.

6. Subdivision must be constructed to provide 1% OFP through the site and directed away from proposed properties and critical infrastructure on site.

7. Treatment can be met using a combination of gross pollutant trap and wetland.

8. To best utilise space a combined detention and wetland design is likely to provide the best solution for stormwater treatment.

7. Recommendations

Flüssig Engineers therefore recommend the following engineering designs be adopted for a future subdivision development to ensure the works meets the inundation code and stormwater management codes:

1. Any future subdivisions should provide allowance for an overland flow path through the subdivision utilising the natural lows in topography as much as possible.

2. Utilising the entrance and exit location at the OFP exit site will provide a reduced impact on flow and on allowable building areas.

3. A total OSD volume of 750.0m^3 is required to detain the maximum developed 2% AEP from pre- to post-development. This will likely require the designation of a single lot for this detention facility.

4. Detention ponds above and below the proposed subdivision sites will be required to be modified to control flow through the subdivision.

5. 2% AEP for future subdivision to be piped to the 2% AEP and drain to the detention pond.

6. Spill way for the detention pond should be designed considering maximum flood forces.

7. The base of the detention pond should be designed as a wetland to best utilise the space during high frequency rainfall events.

8. Proposed treatment to meet stormwater strategy can consist of a GPT and wetland arrangement.

9. All devices and overland flow paths are to be designed to ensure they are fit for purposes and maintained to ensure they do not fail.

Under the Stormwater Management Plan, the development site will meet current specified standards for both quantity and quality control.

8. Limitations

Flüssig Engineers were engaged by **Woolcott Surveys** for the purpose of a site-specific stormwater management plan for 1 Old Forcett Road as per E15.0 and E7.0 of the Sorell Council Interim Planning Scheme 2015 for the purpose of a rezoning application. This study is deemed suitable for purpose at the time of undertaking the study. If the conditions of the subdivision should change, the plan will need to be reviewed against all changes.

This report is to be used in full and may not be used in part to support any other objective other than what has been outlined within, unless specific written approval to do otherwise is granted by Flüssig Engineers.

Flüssig Engineers accepts no responsibility for the accuracy of third-party documents supplied for the purpose of this stormwater management plan.

9. References

Australian Disaster Resilience Guideline 7-3: Technical flood risk management guideline: Flood hazard, 2014, Australian Institute for Disaster Resilience CC BY-NC

Ball J, Babister M, Nathan R, Weeks W, Weinmann E, Retallick M, Testoni I, (Editors), 2019, Australian Rainfall and Runoff: A Guide to Flood Estimation, Commonwealth of Australia

Grose, M. R., Barnes-Keoghan, I., Corney, S. P., White, C. J., Holz, G. K., Bennett, J., ... & Bindoff, N. L. (2010). Climate Futures for Tasmania: General Climate Impacts Technical Report.

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MIDSON traffic pty ltd

Woolcott Surveys

Old Forcett Road Subdivision
Dodges Ferry
Traffic Impact Assessment

October 2020

ENGINEERS AUSTRALIA

PROFESSIONAL ENGINEER OF THE YEAR
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1. Introduction

1.1 Background

Midson Traffic were engaged by Woolcott Surveys to prepare a traffic impact assessment for a proposed rezoning and industrial subdivision in Dodges Ferry.

1.2 Traffic Impact Assessment (TIA)

A traffic impact assessment (TIA) is a process of compiling and analysing information on the impacts that a specific development proposal is likely to have on the operation of roads and transport networks. A TIA should not only include general impacts relating to traffic management, but should also consider specific impacts on all road users, including on-road public transport, pedestrians, cyclists and heavy vehicles.

This TIA has been prepared in accordance with the Department of State Growth (DSG) publication, *A Framework for Undertaking Traffic Impact Assessments*, September 2007. This TIA has also been prepared with reference to the Austroads publication, *Guide to Traffic Management,* Part 12: *Traffic Impacts of Developments*, 2019.

Land use developments generate traffic movements as people move to, from and within a development. Without a clear understanding of the type of traffic movements (including cars, pedestrians, trucks, etc), the scale of their movements, timing, duration and location, there is a risk that this traffic movement may contribute to safety issues, unforeseen congestion or other problems where the development connects to the road system or elsewhere on the road network. A TIA attempts to forecast these movements and their impact on the surrounding transport network.

A TIA is not a promotional exercise undertaken on behalf of a developer; a TIA must provide an impartial and objective description of the impacts and traffic effects of a proposed development. A full and detailed assessment of how vehicle and person movements to and from a development site might affect existing road and pedestrian networks is required. An objective consideration of the traffic impact of a proposal is vital to enable planning decisions to be based upon the principles of sustainable development.

This TIA also addresses the relevant clauses of Codes E5.0, *Road and Railway Assets Code*, and E6.0, *Parking and Access Code*, of the Sorell Interim Planning Scheme, 2015.

1.3 Statement of Qualification and Experience

This TIA has been prepared by an experienced and qualified traffic engineer in accordance with the requirements of Council's Planning Scheme and The Department of State Growth's, *A Framework for Undertaking Traffic Impact Assessments*, September 2007, as well as Council's requirements.

The TIA was prepared by Keith Midson. Keith's experience and qualifications are briefly outlined as follows:

- 24 years professional experience in traffic engineering and transport planning.
- Master of Transport, Monash University, 2006
- Master of Traffic, Monash University, 2004

- Bachelor of Civil Engineering, University of Tasmania, 1995
- Engineers Australia: Fellow (FIEAust); Chartered Professional Engineer (CPEng); Engineering Executive (EngExec); National Engineers Register (NER)

1.4 Project Scope

The project scope of this TIA is outlined as follows:

- Review of the existing road environment in the vicinity of the site and the traffic conditions on the road network.
- Provision of information on the proposed development with regards to traffic movements and activity.
- Identification of the traffic generation potential of the proposal with respect to the surrounding road network in terms of road network capacity.
- Review of the parking requirements of the proposed development. Assessment of this parking supply with Planning Scheme requirements.
- Traffic implications of the proposal with respect to the external road network in terms of traffic efficiency and road safety.

1.5 Subject Site

The subject site is a large parcel of land bound by Old Forcett Road and Carlton River Road.

The subject site and surrounding road network is shown in Figure 1.

Figure 1 Subject Site & Surrounding Road Network

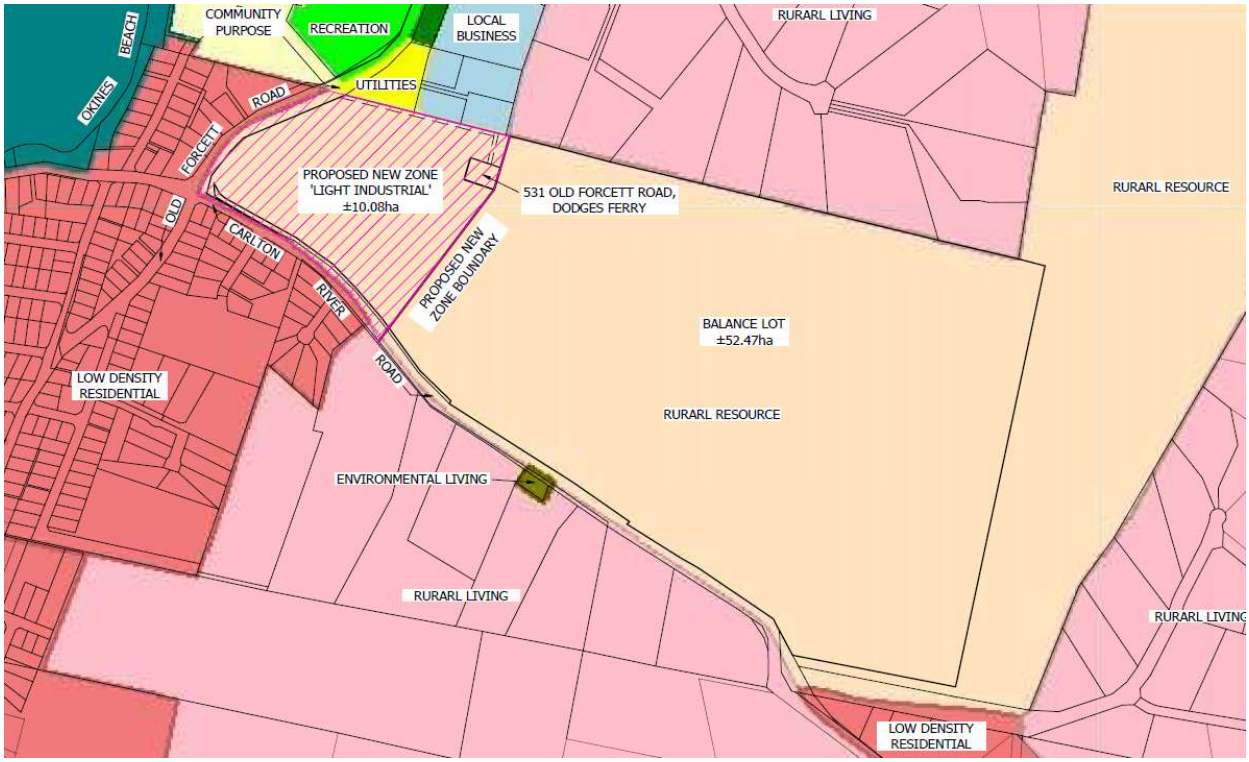


Image Source: Woolcott Surveys

1.6 Reference Resources

The following references were used in the preparation of this TIA:

- Sorell Interim Planning Scheme, 2015 (Planning Scheme)
- Austroads, *Guide to Traffic Management,* Part 12: *Traffic Impacts of Developments*, 2019
- Austroads, Guide to Road Design, Part 4A: Unsignalised and Signalised Intersections, 2017
- Department of State Growth, *A Framework for Undertaking Traffic Impact Assessments*, 2007
- Roads and Maritime Services NSW, *Guide to Traffic Generating Developments*, 2002 (RMS Guide)
- Roads and Maritime Services NSW, *Updated Traffic Surveys,* 2013 (Updated RMS Guide)
- Australian Standards, AS2890.1, *Off-Street Parking*, 2004 (AS2890.1:2004)

2. Existing Conditions

2.1 Transport Network

For the purposes of this report, the transport network consists of Old Forcett Road and Carlton River Road.

2.1.1 Old Forcett Road

Old Forcett Road is a major collector road that connects between Carlton Beach Road and the Arthur Highway. It is approximately 5.9 kilometres in length. At the intersection with Carlton River Road, Old Forcett Road becomes Carlton Beach Road leading into the Dodges Ferry commercial area.

Old Forcett Road provides primary access for the Dodges Ferry and Carlton Beach areas. The road provides access from Arthur Highway to these areas, providing a key link for commuter, recreational, school and residential traffic for these areas.

The section of Old Forcett Road between Okines Road and Carlton River Road represents a 'transition zone' between rural environment to the north, and residential environment in Carlton Beach Road. This transition is represented in the speed signage (reduced from 80-km/h to 60-km/h, and then 50-km/h for Carlton Beach Road) and the roadside environment, which consists of scattered development along its length.

The traffic volume of Old Forcett Road is 5,100 vehicles per day[1].

Old Forcett Road near the subject site is shown in Figure 2.

Figure 2 Old Forcett Road

[1] Sorell Council traffic data, 2014.

Figure 3 Old Forcett Rd at Carlton River Rd Intersection

2.1.2 Carlton River Road

Carlton Beach Road is a major collector road and serves as the main street through Dodges Ferry residential and commercial areas. It carries approximately 3,500 vehicles per day[2] with a 310 vehicle per hour afternoon peak. Carlton Beach Road has a speed limit of 50-km/hr within the vicinity of the Carlton River Road/ Old Forcett Road intersection.

Carlton River Road adjacent to the subject site is shown in Figure 4.

Figure 4 Carlton River Road

[2] 2020 estimate factored from 2009 traffic data from Sorell Council.

2.2 Road Safety Performance

Crash data can provide valuable information on the road safety performance of a road network. Existing road safety deficiencies can be highlighted through the examination of crash data, which can assist in determining whether traffic generation from the proposed development may exacerbate any identified issues.

Crash data was obtained from the Department of State Growth for a 5½ year period between 1st January 2015 and 30th June 2020 for Old Forcett Road between Oakines Road and Carlton River Road, and Carlton River Road between Old Forcett Road adjacent to the subject site.

The findings of the crash data is summarised as follows:

Old Forcett Road

- A total of 11 crashes have been reported between Carlton River Road and Rantons Road.
- Severity. 1 crash involved serious injury; 2 crashes involved minor injury; 8 crashes involved property damage only.
- Day of week. No clear crash trend was noted by day of week. 3 crashes were reported on Sundays and Fridays, and 1 crash was reported for each other day of the week.
- Time of day. The majority of crashes were reported between 9:00am and 6:00pm (10 crashes). 1 crash was reported at 9:40pm.
- Crash types. No clear crash type trends were noted. The most common crash type were 'rear-end' related crashes were the most common crash type (2 x 'right-rear'; 1 x 'rear-end'; and 1 x 'left-rear').

Crash locations. Crashes were relatively evenly distributed along Old Forcett Road as shown in

- Figure 5.
- Vulnerable road users. 1 crash involved a motorcycle. This crash occurred at 5:25 on 5th August 2016 and involved a 'emerge from driveway' collision between a car and a motorcycle.

Carlton River Road

- A total of 7 crashes were reported in Carlton River Road near the subject site.
- Severity. 1 crash involved serious injury; 1 crash involved minor injury; 2 crashes involved first aid at the scene; and 3 crashes involved property damage only.
- Day of week. All crashes were reported on weekdays. Tuesdays had the highest incidence with 3 reported crashes.
- Time of day. The majority of crashes were reported between 9:00am and 6:00pm (5 crashes). 1 crash was reported at 5:10am and 1 crash was reported at 9:41pm.

- Crash types. No clear crash type trends were noted. The majority of crashes involved a single vehicle leaving the carriageway.
- Crash locations. Crashes were relatively evenly distributed along Old Forcett Road as shown in Figure 6.
- Vulnerable road users. No crashes involved vulnerable road users (pedestrians, cyclists or motorcyclists).

The crash data does not indicate that there are any existing road safety issues associated with the network that might be exacerbated by traffic generated by the proposed development.

Figure 5 Old Forcett Road Crash Locations

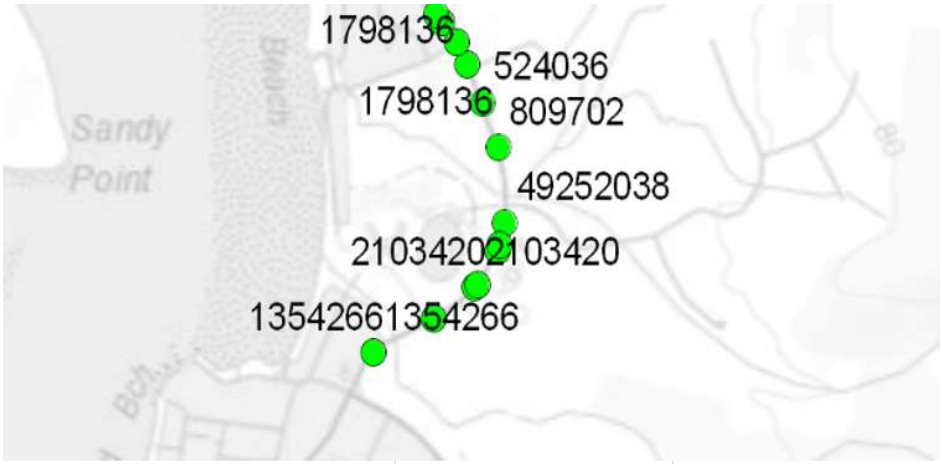
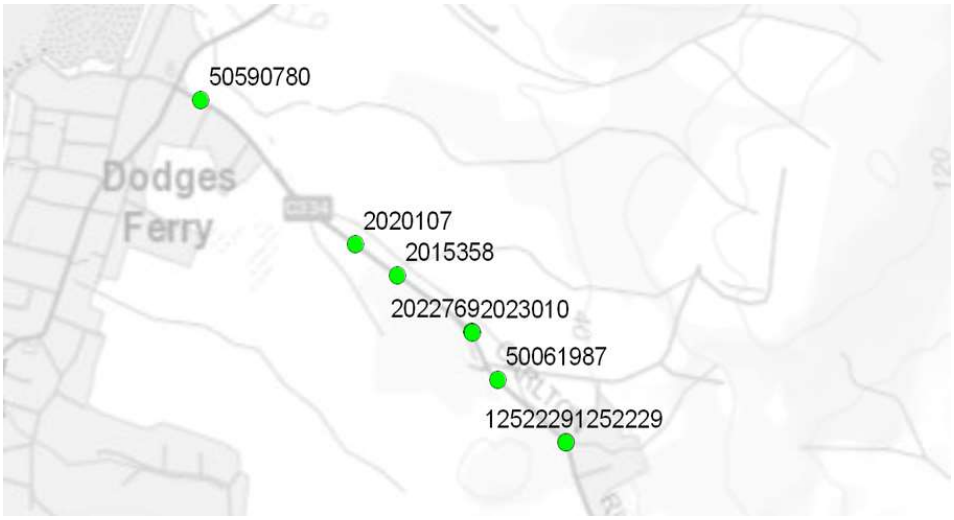


Figure 6 Carlton River Road Crash Locations



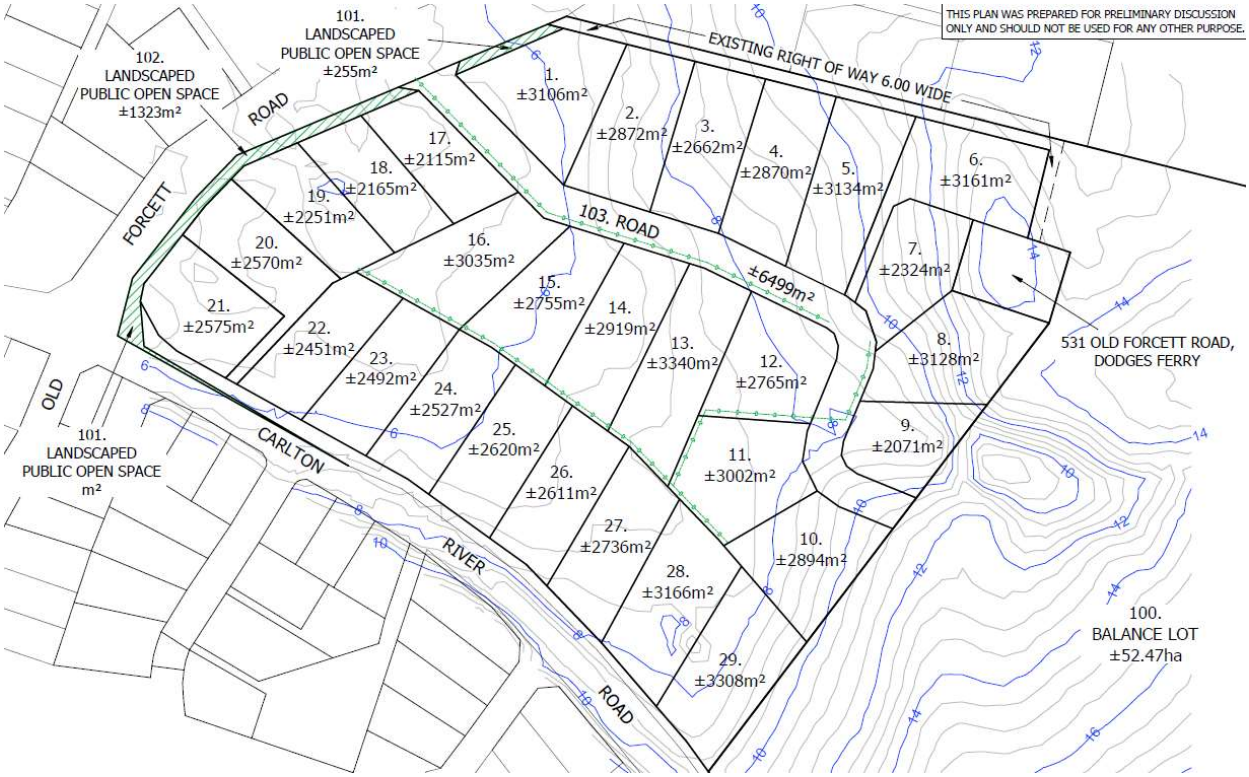
3. Proposed Development

3.1 Development Proposal

The proposed development involves rezoning of land to facilitate a 29-lot industrial subdivision. A new internal road connection with Old Forcett Road is proposed that will eventually connect to future stages of the subdivision.

The rezoning proposal is shown in Figure 1 and the proposed subdivision layout is shown in Figure 7.

Figure 7 Proposed Development Plans



4. Traffic Impacts

4.1 Traffic Generation

Traffic generation rates were sourced from the Roads and Traffic Authority of NSW publication, *Guide to Traffic Generating Developments,* 2002 (RTA Guide). The RTA Guide provides the following equations for the peak hour traffic generation of Business Parks:

- Equation (a)

  Peak hour vehicle trips (PVT) = 1.1 vehicles per hour two-way per 100m^2 of total gross leasable floor area.

- Equation (b)

  Peak hour vehicle trips (PVT) = 1.2 vehicles per hour two-way per 100m^2 of gross leasable office/ showroom area + 1.0 vehicle per hour two-way per 100m^2 of gross leasable factory/ warehouse area.

The RTA Guide also provides a rate for service vehicle trips:

- Peak service vehicle trips

  Peak service vehicle trips (PSVT) = 0.5 vehicles per hour two-way per 100m^2 of gross leasable factory/ warehouse area.

Given a total developable site area of 10.08 hectares, the total gross leasable floor area is expected to be in the order of 15,120m^2 (approximately 15% of total site area). This results in a traffic generation as follows:

- Peak hour vehicle trips (PVT) = 166 vehicles per hour
- Peak service vehicle trips (PSVT) = 76 vehicles per hour

The proposed industrial subdivision is likely to generate in the order of 1,660 vehicles per day based on the total site area and peak hour rates set out in the RTA Guide when fully developed.

4.2 Trip Distribution

In broad terms, the traffic generation will be divided relatively evenly between all lots as they are of similar sizes. Each lot would therefore generate an average traffic volume of 57 vehicles per day, with an average peak of 6 vehicles per hour.

The distribution of the traffic generation on the transport network is therefore summarised in Table 1.

Table 1 Network Traffic Generation

Road Frontage	Lots	Daily Traffic Generation	Peak Hour Generation
Old Forcett Road	2	114 vpd	12 vph
Carlton River Road	10	570 vpd	60 vph
New Internal Road	17	969 vpd	102 vph

4.3 Sight Distance

The Acceptable Solution A1 of Clause E5.6.4 of the Planning Scheme states "*Sight distances at an access or junction must comply with the Safe Intersection Sight Distance shown in Table E5.1*". The requirements for Table E5.1 are reproduced in Table 2.

Table 2 Planning Scheme Sight Distance Requirements

Vehicle Speed	Safe Intersection Sight Distance in metres, for speed limit of:	
km/h	60 km/h or less	Greater than 60 km/h
50	80	90
60	105	115
70	130	140
80	165	175
90		210
100		250
110		290

Table E5.1 requires a Safe Intersection Sight Distance (SISD) of 105 metres for a vehicle speed of 60-km/h within a speed limit of 60-km/h or less, and 80 metres for a vehicle speed of 50-km/h within a speed limit of 60-km/h or less.

The following is relevant with respect to the accesses associated with the development proposal:

- The new road junction connecting to Old Forcett Road has available sight distance exceeding 105 metres in both directions.
- The two lots fronting onto Old Forcett Road have available sight distance exceeding 105 metres in both directions.
- All lots fronting onto Carlton River Road have available sight distance exceeding 80 metres in both directions.
- The proposed internal subdivision road has winding geometry towards its eastern end. Access to lots fronting this section of road will need to be carefully considered to ensure that adequate sight distance is available for prevailing vehicle speeds.

It was noted that existing vegetation located along Old Forcett Road in the vicinity of the proposed access junction restricted sight distance. It has been assumed in this report that this vegetation will be removed to facilitate the construction of the subdivision.

Based on the above assessment, the development proposal meets the requirements of Acceptable Solution A1 of Clause E5.6.4 of the Planning Scheme.

4.4 Road Safety Impacts

There are no significant detrimental road safety impacts foreseen for the proposed industrial subdivision. This is based on the following:

- The surrounding road network is able to adequately absorb the traffic generated by the proposed development (peak of 166 vehicles per hour).
- The existing road safety performance of the road network does not indicate that there are any current road safety deficiencies that might be exacerbated by the proposed development. Noting specifically that there have been no crashes reported at the intersection of Old Forcett Road and Carlton River Road.
- Adequate sight distance is available at the proposed access locations in Old Forcett Road and Carlton River Road in relation to the prevailing vehicle speeds.

4.5 Parking Assessment

Each lot should provide adequate on-site parking in accordance with the requirements of E6.0 of the Planning Scheme.

The internal road should be designed to facilitate on-street parking where appropriate. Consideration should also be given for the manoeuvring of heavy vehicles associated with industrial lot development on an individual basis.

5. Conclusions

This traffic impact assessment (TIA) investigated the traffic and parking impacts of a proposed rezoning and industrial subdivision development fronting onto Old Forcett Road and Carlton River Road.

Traffic generation of potential future lot development has been estimated based on general industrial development that may occur on the rezoned land. Detailed traffic impact assessments may need to be undertaken for the development of each individual lot to determine the specific impacts of each lot on the surrounding road network. This TIA therefore provides a high-level overview of potential impacts on the broader transport network.

The key findings of the TIA are summarised as follows:

- The traffic generation of the proposed development is likely to be 1,660 vehicles per day with a peak of 166 vehicles per hour.
- A new subdivision road is proposed that will connect to Old Forcett Road at a T-junction. The location of the new junction is considered appropriate in terms of safety (location with respect to nearby road junctions and available sight distance) and efficiency (for the overall subdivision and the transport network).
- The available sight distance at the site's main access locations on Old Forcett Road and Carlton River Road meet the requirements of Acceptable Solution A1 of Clause E5.6.4 of the Planning Scheme.

Based on the findings of this report the proposed development is supported on traffic grounds.

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